

85476



Class _____ *No.* _____

Presented by

IN EXCHANG

2¹⁵

31

JOURNAL OF THE
MASSACHUSETTS ASSOCIATION OF
BOARDS OF HEALTH

VOLUMES I. TO VI.
INCLUSIVE

BOSTON
MAYNARD & SMALL
6 BEACON STREET
1897

INDEX

TO THE

JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

First Six Volumes.

[In the following index, the first figure following each reference indicates the volume; the second figure the number; and the third figure the page on which the reference may be found.]

No copies of the first number of Volume II. were published.

A

ABBOTT, Dr. S. W. Discussion on Cholera	2	3	13
Discussion on Typhoid Fever from Infected Milk	3	2	22
Report of Committee on estimating Populations	3	2	26
Discussion on Small-pox	4	2	20
Tuberculosis	4	3	20
Death Certificates	4	4	6, 6
English Regulations on School-closing	4	4	18
ALLEN, C. A. Discussion on Sewage Disposal	1	1	44
Antitoxin, Address on. Dr. H. C. Ernst	5	1	13
Discussion by Dr. G. T. Swarts	5	1	18
Dr. C. L. French	5	1	21

B

BAILEY, A. J., Esq., on Legal Powers of Boards of Health	3	1	20
BANCROFT, Hon. W. A. Address of Welcome	4	4	1
Bathing Establishment at Brookline	6	1	41
Boston Main Drainage Works. F. P. Stearns, C. E.	1	4	154
BOWERS, Dr. Discussion on Metropolitan Water Supply	5	3	79
Restricting the Spread of Measles	6	4	110

JUN 18 1913

85476

BRANDEIS, L. D., Esq. Discussion on Cholera	2	3	19
BRIMBLECOM, J. C. Discussion on Garbage Disposal	5	4	121, 6 1 8
Removal of Infected Persons	6	3	79

C

CHASE, Dr. H. L. Discussion on Cholera	2	3	16
Paper on Disinfection	5	4	94
CHAPIN, Dr. C. V. Discussion on Garbage Disposal	1	1	20
Discussion on Death Certificates	4	4	9, 6 1 14
Disinfection	5	4	106
Contagious Period of Scarlet Fever	6	2	51
Restricting the Spread of Measles	6	4	107
CHAPIN, Dr. W. H. An Epidemic of Typhoid Fever	3	2	3
On Tuberculosis	4	3	2
Cholera. Paper by Dr. J. H. McCollom	2	3	3
Discussion by Dr. F. Irwin	2	3	11
Dr. S. W. Abbott.	2	3	13
Dr. H. L. Chase	2	3	16
Dr. E. Sawyer	2	3	17
Dr. George H. Rohé	2	3	18
L. D. Brandeis, Esq.	2	3	19
Dr. C. H. Cogswell	2	3	25
CLARK, Dr. J. E. Discussion on Antitoxin	5	1	24
COFFEY, J. C. On a local Epidemic of Diphtheria	2	2	5
Discussion on Garbage Disposal	2	4	21
Garbage Disposal	5	4	19
Health Legislation	4	4	14
COGSWELL, Dr. C. H. Discussion on Cholera	2	3	25
Contagious Diseases. Discussion on	1	2	63-70
Cremation of Garbage. Paper by W. F. Morse	2	4	3

D

Dairies and Cow Stables. Regulation of by Boston Board of Health	2	2	25
Paper by Dr. A. Peters	2	2	26
DAVENPORT, Dr. B. F. Discussion on Legislation	4	4	15
Discussion on Removal of Infected Persons	6	3	74
Death Certificates. Paper by Dr. W. Y. Fox	4	4	3
Discussion on. Dr. S. W. Abbott	4	4	6
Dr. E. Farnham	4	4	9, 6 1 10
Dr. C. V. Chapin	4	4	9
Dr. W. G. Macdonald	6	1	11
Report of Committee on	5	4	87

INDEX

v

Diphtheria. A Local Epidemic of. J. C. Coffey	2	2	5
Differential Diagnosis of. W. H. Prescott	2	2	12
Culture Diagnosis of. Dr. H. C. Ernst	6	1	17
Discussion on, by Drs. Swarts, Smith, Rogers, and Shea	6	1	28
Disinfection, Efficient. Paper by Dr. H. L. Chase	5	4	94
Discussion on. W. F. Morse	5	4	98
Disinfection of Farm Buildings and Stables. Paper by Dr. A. Peters	5	4	103
DROWN, Prof. T. M. Discussion on Sewage Disposal	1	1	40
DURGIN, Dr. S. H. Discussion on Diphtheria	2	2	23
Disposal of Domestic Garbage	5	2	31
Regulation of Dairies	3	1	4
Removal of Infected Persons	6	3	73
On Health Regulations	6	4	100
On Restricting the Spread of Measles	6	4	111

E

ERNST, Dr. H. C. Paper on Rabies	1	2	92
Discussion on Tuberculosis	4	3	6
Paper on Culture Diagnosis of Diphtheria	6	1	17

F

FARNHAM, Dr. E. Discussion on Death Certificates	4	4	9,	6	1	10
Paper on Statistics of Phthisis in Cambridge	4	4				17
Removal of Infected Persons	6	3				72
Paper on Restricting the Spread of Measles	6	4				103
FIELD, Dr. J. B. Paper on Garbage Disposal	1	1				9
Discussion on Certificates of Death	5	1				27
Paper on Garbage Disposal for Large and Small Cities	5	4				107
Contagious Period of Scarlet Fever	6	2				57
Filtration of Sewage-polluted Water through Sand. Prof. W. T.						
Sedgwick	5	2				46
FISK, E. P. On the Metropolitan Sewage System	1	4				160
FLOYD, Mr. On Metropolitan Water Supply	5	3				81
Food Adulteration, Discussion on	1	2				62
FOSTER, Dr. F. A. On Diphtheria in Schools	3	4				9
FOX, Dr. W. Y. Paper on Death Certificates	4	4				3

G

Garbage, Disposal of. Paper by W. F. Morse	2	4	18
I. M. Simonin	2	4	14

Garbage, Disposal of, *continued*,—

Discussion by Dr. J. B. Field, J. C. Coffey, H. F. Hurlbut, and E. B. Hayes	2	4	18-34
Apparatus for Domestic Disposal. Dr. S. H. Durgin	5	2	31
Disposal for Large and Small Cities. Paper by Dr. J. B. Field	5	4	107
Discussion by Dr. T. Smith, J. C. Coffey, W. F. Morse, and J. C. Brimblecom	5	4	117-123
GOVE, Wm. H. Discussion on Scarlet Fever	6	2	58
Removal of Infected Patients	6	3	68
Remarks on the Power to make Health Regulations	6	4	86

H

HAYES, Hon. E. B. Discussion on Garbage Disposal	2	4	34
Health, Local Boards, Legal Powers of. A. J. Bailey	3	1	20
Mr. Lincoln	3	1	28
Mr. Whitney	3	1	32
Town of Concord	6	1	43
Health Regulations, Power to make. Remarks by W. H. Gove, City Solicitor Pevey of Cambridge, T. Todd, Dr. B. F. Davenport, Dr. S. H. Durgin, Dr. French, Mr. Farwell	6	4	86-102
HURLBUT, H. F. Discussion on Garbage Disposal	2	4	32

I

Infectious Diseases. Paper by Dr. J. H. McCollom	1	3	120
Discussion on	1	3	138
IRWIN, Dr. F. Discussion on Cholera	2	3	11

J

JAMES, Hon. H. Address of Welcome	5	4	84
---	---	---	----

K

KINNICUT, Prof. L. P. Sewage Disposal. At Worcester	1	1	22, 5 2 49
KLEBS, Prof. E., Remarks of	5	4	83

L

Legislation, Paper on. E. M. Parker, Esq.	4	4	10
LYNCH, Mr. Discussion on Plumbing	3	4	18

M

MACDONALD, Dr. W. G. Discussion on Death Certificates	6	1	11
Massachusetts Association of Boards of Health. Organization . . .	1	1	3
First meeting at Boston	1	1	4
Other meetings at Boston, 1 2 57, 1 4 151, 2 3 3, 3 1 3, 3 2 3, 4 1 1, 4 2 1, 4 3 1, 5 1 1, 5 3 57, 6 1 1, 6 2 47, 6 3 67, 6 4 85.			
At Brockton	5	2	29
At Brookline	5	4	83
At Cambridge	4	4	1
At Lowell	1	1	5
At Lynn	2	4	3
At Newton	1	3	117
At Princeton	3	4	3
At Salem	6	2	47
At Springfield	1	4	153
At Waltham	2	2	3
At Worcester	1	1	7
Measles, Restricting the Spread of. Discussion by Dr. Farnham, Dr. Chapin, Dr. Field, Dr. Durgin, Mr. Newcomb	6	4	103-112
MAYBERRY, Hon. G. L. Address of Welcome	2	2	3
MCCARTNEY, J. F. Discussion on plumbing	3	4	10
MCCOLLOM, Dr. J. H. Paper on Infectious Diseases	1	3	120
Discussion on Diphtheria	2	2	14
Paper on Cholera	2	3	3
Discussion on Small-pox	4	2	2
Metropolitan Water Supply. Remarks by Dr. H. P. Walcott . . .	5	3	59
Remarks by E. H. Roberts	5	3	67
E. I. Smith	5	3	77
Dr. W. P. Bowers	5	3	79
Mr. Floyd	5	3	81
MILLER, Dr. A. E. Removal of Infected Persons	6	3	80
MITCHELL, W. H. On Progress in Plumbing	5	1	4
MORSE, W. F. Paper on Destruction of Garbage	2	4	3
Discussion on Destruction of Garbage	5	4	121
Steam Disinfection	5	4	98

N

NEWCOMB, R. L. On Scarlet Fever	6	2	63
Restricting Spread of Measles	6	4	111
NORTON, Dr. J. S. Discussion on Tuberculosis	4	3	13
Scarlet Fever	6	2	60
Plumbing	6	3	80

P

Parochial Schools, Power of Local Boards of Health over. Discussion	6	1	7
PARKER, E. M. Paper on Health Legislation	4	4	10
Discussion on publications	6	1	5
PETERS, Dr. A. Paper on Rabies	1	2	102
Disinfection of Farm Buildings, etc.	5	4	103
PEVEY, G. A., Esq. Power to make Health Regulations	6	4	94
Plumbing. Paper by J. F. McCartney	3	4	10
Report of Committee on Recommendations on Plumbing Laws	4	1	3
Discussion on by Messrs. Devlin, Hathaway, Newcomb, Mills, Hicks, Woodward, Davenport, C. E. Abbott, Dike, Norton, Quinn, Morrow, Davis, and Thomas	4	1	8-44
Paper on, by W. H. Mitchell	5	1	4
Discussion on, by J. C. Coffey	5	1	8
J. W. Cosden	5	1	7, 6 3 82
Dr. B. F. Davenport	5	1	10
Precipitation of Sewage by Chemicals. Professor L. P. Kinnicut	5	2	49
PRESCOTT, Dr. W. H. On Differential Diagnosis of Diphtheria	2	2	12
On Contagious Period of Scarlet Fever	6	2	49
Publications and Legislation. Discussion on	6	1	4
Public Institutions. Authority of Boards of Health over	6	1	43

Q

QUINN, E. N. On Plumbing Laws and Regulations	4	1	26
---	---	---	----

R

Rabies. Paper by Dr. H. C. Ernst	1	2	92
Paper by Dr. A. Peters	1	2	102
ROBERTS, E. H. On Metropolitan Water Supply	5	3	67
ROGERS, Dr. O. F. Discussion on Diphtheria Cultures	6	1	35
ROHÈ, Dr. G. H. Discussion on Cholera	2	3	18

S

SARGENT, Dr. Discussion on Scarlet Fever	6	2	61
SAWYER, Dr. E. A. Discussion on Cholera	2	3	17
Scarlet Fever, Contagious Period of. Discussion by Drs. Prescott, Chapin, Shea, Field, Norton, and Sargent	6	2	49-61
School-houses, Paper on Ventilation of. By F. Tudor	1	2	72
Schools, Closing of, during Epidemics, Discussion on	3	4	4, 4 4 18

SEDGWICK, Prof. W. T.	Discussion on Sewage Disposal	1	1	42
	Milk Supplies	2	2	31
	On an Epidemic of Typhoid Fever due to Infected Milk	3	1	5, 3
	On Purification of Polluted Water by Sand Filtration	5	2	46
Sewage and Sewage Disposal and Description of Worcester Precipitation Works. By Prof. L. P. Kinnicut		1	1	22
Sewage Disposal of Boston. Paper by F. P. Stearns, C.E.		1	4	154
List of Places in Massachusetts having Sewage Disposal		5	2	33
Sewage Filtration and Municipal Sanitation. F. H. Snow, C.E.		5	2	34
Sewerage, Metropolitan System. E. P. Fisk		1	4	160
SHEA, Dr. T. B.	Discussion on Diphtheria Cultures	6	1	33
	Scarlet Fever	6	2	56
	Removal of Infected Persons	6	3	69
SIMONIN, I. M.	On Disposal of Garbage	2	4	14
Small-pox, Discussion on. Dr. J. H. McCollom		4	2	2
	Drs. W. H. Chapin, Field, Swift, S. W. Abbott, Bayles, Gage, and MacDon-			
	ald	4	2	2-23
SMITH, E. I.	On Milk Supplies	2	2	32
	Plumbing	3	4	19
	Plumbing Laws (Report of Committee)	4	1	3
	Sewer Connections	5	2	52
	Metropolitan Water Supply	5	3	77
SMITH, Dr. THEOBALD.	On Garbage Disposal	5	4	117
	Diphtheria Cultures	6	1	32
STEARNS, F. P., C.E.	The Boston Main Drainage Works	1	4	154
SWARTS, Dr. G. T.	Discussion on Typhoid Fever due to Infected Milk	3	1	16
	Discussion on Diphtheria Cultures	6	1	28
SWIFT, Dr. W. N.	On Small-pox in New Bedford	4	2	14

T

TOBEY, Dr. G. L.	On School Closing in Epidemics	3	4	5
Tuberculosis, Discussion on. By Drs. W. H. Chapin, Ernst, Vickery, Norton, Sawyer, Gage, and S. W. Abbott		4	3	2-20
TUDOR, F.	Paper on School-house Ventilation	1	2	72
Typhoid Fever, due to Infected Milk. Paper by Prof. W. T. Sedgwick		3	1	5, also 3
Typhoid Fever Discussion. By Drs. Swarts, S. W. Abbott, and Woodward		3	1	16-24
TODD, THOMAS.	On Health Regulations	6	4	97

V

Vaccination. Resolution of Association	4	2	3,	6	2	65
Ventilation of School-houses. Paper by F. Tudor, Engineer	1	2				72
Extract from Report of State Board of Health of Maine	2	4				36
VICKERY, Dr. H. F. Discussion on Tuberculosis	4	3				11

W

WALCOTT, Dr. H. P. On the Metropolitan Water Supply	5	3				59
Removal of Infected Persons	6	3				78
WHIPPLE, Hon. J. J. Address of Welcome	5	2				29
WARDELL, E. Discussion on Plumbing	6	3				81

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are two dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, **EDWIN FARNHAM, M.D., City Hall, Cambridge, Mass.**

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

6 Beacon Street, Boston.

JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

January Annual Meeting
1895

SUBJECTS: Medical Inspection of Schools in
Boston; Progress in Plumbing; A Talk on
Anti-toxine; Physicians' Return of Death.

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are three dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

P.O. Box 2510, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. V.

April, 1895.

No. 1

PROCEEDINGS OF THE ANNUAL MEETING

OF THE

Massachusetts Association of Boards of Health,

Held at the Parker House, Jan. 24, 1895.

Dr. H. P. Walcott, President of the Association, upon calling the meeting to order at the close of the dinner, announced the absence of the Secretary, and that it would be necessary to elect a Secretary *pro tem*.

It was moved and seconded that Mr. J. C. Coffey act in that position, and the motion was carried.

The records of the last meeting were read by the Secretary.

Dr. Durgin stated that the last resolution contained in the record of the previous meeting should be credited to Dr. Davenport.

The Chairman stated that the correction would be made; and, if there was no objection, the record would stand as that of the last meeting.

The Chairman presented, on behalf of the Executive Committee, the following names of persons recommended for membership in the Association:—

JOHN C. BRIMBLECOM, of the Newton Board of Health.

WILLIAM S. RICHARDSON, of the Marlborough Board of Health.

WILLIAM H. MITCHELL, of Boston.

LAURENS MAYNARD, of Boston.

HERBERT SMALL, of Boston.

DAVID P. WATERS, of the Salem Board of Health.

RICHARD D. CONNELLY, of the Salem Board of Health.

WILLIAM G. KIRSCHBAUM, of New Bedford.

DR. A. E. MILLS, of Needham.

It was moved and seconded that the above-named gentlemen be constituted members of the Association; and, the motion having been carried, the Chairman announced that they were duly elected.

The report of the Treasurer was then read, and the Chairman stated that the report had been duly audited by a member of the Committee; and, if there was no objection, it would be accepted and placed on file.

The Chairman announced that the next business in order was the election of officers for the ensuing year, and Dr. Durgin moved that the Chair appoint a Committee of five to nominate officers; and the motion was seconded and carried, and the following Committee was appointed: Messrs. Fox, Field, Davis, Clark, and Professor Drown; and the Committee retired to consult.

While the Committee was deliberating, the Chairman announced that he had received a letter from the Brockton Board of Health, inviting the Association to hold its next meeting in Brockton, and examine the new Brockton sewerage plant.

Dr. Durgin moved that this invitation from the authorities of Brockton be accepted, and that the Association hold its next meeting at Brockton in April. The motion was seconded and carried.

MR. CHARLES H. CARY.—As a member of the Board of Health of Brockton, I will say that we should like to have the Association come as early in the day as possible. A train leaves Boston about 10.15, and reaches Brockton at 11; and, if they come by that, there will be time for the members to look over our new sewerage plant, which is some distance away. The next train does not get there until 12.30, which would allow but a very short time for its examination.

THE CHAIRMAN.—If there is no objection made to the arrangement proposed by the gentleman from Brockton, it will be understood that the Committee of Arrangements will make their plans for an early visit to Brockton on the appointed day.

Is there any other business which any one would like to bring before the Board while we are waiting for the Committee to report?

DR. S. H. DURGIN.—I will use a few minutes before the return of the Committee to say one word for the Committee on Printing. After a series

of disappointments in years past in the publication of our quarterly journal, we have finally got a very satisfactory contract; and I think it is fair to presume that hereafter you will get your reports very much earlier, and in very much better shape than ever before. If any member of the Association fails to receive a copy of the report, and he will notify me, I will see that one is sent to him.

I will also say a word in regard to a new field of work we have taken up in Boston in the last two months, that of examining the schools for contagious diseases and other unhealthy conditions of the pupils. I have received many inquiries from different parts of the State and from without concerning this work; and for that reason I am inclined to make a few statements, thinking you may be interested in our work of inspecting the schools.

On the first day of November last we set at work fifty physicians, selected with care, for the purpose of visiting every school-house each day during the morning session, to see what children were complaining or could be found too ill to remain in school. The method is to have the teachers ascertain what children are complaining or are apparently ill, and to have the attention of the physician drawn to those children for examination. It would be impossible for these physicians to go into the schools and personally examine every pupil: the teacher's calling his attention to those who are ill is the only practicable method. So far the work has gone on favorably, and every one seems to be well pleased with it.

I cannot give you the result for December, but during the month of November we found no less than 137 cases of contagious disease in the schools. We found 26 cases of diphtheria in children sitting with the other pupils. Those 26 had cultures taken, in which the Klebs-Loeffler bacillus was found. We found about 450 cases of sore throat, in which no culture was taken; and we can't say how many of those might have proved to be diphtheria also. In all, about 1,700 children were found during the month of November who were too ill to remain in school. These same officers are called upon as agents of the Board of Health to keep a surveillance over the isolation of all cases of diphtheria and scarlet fever reported within the city; and before their release from isolation there is required a certificate of recovery from the officer, based upon a bacteriological test to ascertain that the diphtheria bacilli have gone.

In regard to using the tongue depressors in the schools, to avoid criticism we use a little piece of pine wood, which is made for the purpose; and after one is used for a single pupil it is burned. These are obtained for about seventy-five cents per thousand, and supplied freely to be used by all of the school inspectors.

The wooden depressors were then passed about for inspection.

The Committee on Nominations reported the following names of officers for the ensuing year:—

President, H. P. Walcott, M.D.

Vice-Presidents, S. H. Durgin, M.D.; S. W. Abbott, M.D.

Secretary, Edwin Farnham, M.D.

Treasurer, J. B. Field, M.D.

Executive Committee: two years, W. H. Chapin; J. E. Clark, M.D.; E. A. Sawyer, M.D.; J. A. Gage, M.D.; J. C. Coffey: one year, W. G. Fox, M.D.

It was moved and seconded that the report of the Committee be accepted and the Committee discharged, and the motion was carried.

It was moved that the gentlemen nominated be elected *viva voce* as officers of the Association for the ensuing year. The motion was seconded and carried; and the Chairman announced that the officers were duly elected, and said:—

“With regard to one name I beg leave to thank you most heartily for placing me again in this position, which I am somewhat ashamed to occupy for so many years in succession; but I do not think I can do anything better than what men generally do in such cases, and that is to refer the responsibility to the people who put me here.

“The first paper in the regular order of our exercises is upon the ‘Progress of Plumbing,’ by Mr. William H. Mitchell; and this paper will be read by Mr. Davis.”

PROGRESS OF PLUMBING.

BY WILLIAM H. MITCHELL.

In the year 310 B.C. aqueducts and baths were first introduced into Rome; but it was ten years later that Aristotle first wrote his works on Mechanics.

It was generally supposed that the Romans were ignorant of the art of raising and conducting water by means of pipes; but it can scarcely be doubted by the statements of Pliny and other authors that not only were they acquainted with the hydrostatical principle, but that they actually used lead pipes for the purpose, and consequently had to employ plumbers, although no doubt under another name than that which we have at the present day. I merely make mention of these facts to show you what a pedigree our profession has, and one of which we, as plumbers, are so proud. But, while we cannot but acknowledge that in the days of Pompeii

they had about all the appliances which we have at the present time in the way of baths and water fixtures, some of which, especially the baths, were of the most elegant designs imaginable, and supplied with the necessary trimmings for hot and cold water service, we can claim in this generation greater advancement along the line of progressive plumbing of any generation of which we have a record; and in our own city, since the introduction of water, it has been marvellous, as Boston has been for years the headquarters of the New England States, and to-day is in the van in excellence of its sanitary specialties, and we can safely say that we are not excelled by any city in the country.

With the introduction of water in 1848 commenced the advancement of plumbing in this city; and the many new houses and buildings which were erected at that time were supplied with the then, as was thought, most modern of water fixtures. The old pump was abandoned, and the pan water-closet and round marble basin were placed in position; and oft-times due regard was not taken in placing them in light and airy places, but, instead, they were put in closets away from light and air, and with no means of ventilation whatever, either local or otherwise. The lead soil pipe was made upon the job, using sheet lead for the purpose, and running a soldered seam up the front. No pipes were carried through the roof; and one trap, "the water-closet one," answered for all the bowls and sinks which came within a distance of some twenty or more feet away from the fixture. Old houses were remodelled to conform to the modern idea, and the plumbers were happy.

Plumbing progressed rapidly at this period. The introduction of water made it possible to utilize marsh land at the south end of the city; and, where the local sportsmen went gunning in years gone by, streets and squares were laid out, and in a short time first-class buildings covered the whole territory. The Back Bay was filled up later, magnificent avenues constructed, and the most aristocratic portion of the city covers the place where school-boys of a former generation went bathing.

Plumbing has progressed rapidly all over this State. Every city and town, according to the report of the State Board of Health, of over five thousand inhabitants, has its water supply. Boston no longer monopolizes the trade: competition comes from all sections of the country. Yet, as regards the quality of the material and the excellence of the workmanship, Boston, in our estimation, still leads the van.

Within a few years the style of plumbing has changed for the better. Trapping and ventilating have removed many of the evils of the old way of doing work. Closed-in plumbing, where filth often accumulates, is going out of fashion. New and improved patterns of lavatories and baths, with plated fixtures, all exposed, placed on marble floors, are very pleasing to

the sight, and, with the rigid inspection of competent mechanics and specialists, make the plumbing of to-day as near perfect as human agency can make it.

In passing here, we cannot but indulge in a little self-esteem granted to ourselves by ourselves, in saying that a great deal of the success of this advancement is due to the energy and push of the plumbers, as a class, both masters and journeymen, assisted by the good will and support of the Boards of Health and Inspection Departments.

Some few years ago the idea of organization was conceived by a few of the leading master plumbers of the United States; and, after the matter was carefully looked into, an organization was effected, out of which a great deal has been done for the advancement of the plumber and the class of work which he executes.

Laws have been made governing all kinds of material and workmanship. Examination boards, composed of men who have the good of the community at heart, have been established. Rigid examinations have been adopted; and incompetent men are not allowed to practise the art which a few years ago was looked down upon, and the name of plumber and his work looked upon with the greatest distrust and suspicion.

Another matter along the line of advancement is the instruction and education of the people who in the future will take the places of those now engaged in the business. The greatest care is being taken with the boys in educating them up to a proper standard of efficiency before starting them out. A trade school has been formed at the North End, and the school is filled with a good class of boys, who have been drawn from the different shops in the city. A boy has to be vouched for by his employer as to his character and standing in the shop in which he is employed, and, after paying a small fee of \$10 per course of fifty lessons, is assigned to a bench and the proper tools given him, and under a competent instructor (who is a practical journeyman) commences his term. He has to appear three nights per week from 7.30 until 10 o'clock, and practise lead working, wiping, making traps, and other pieces of work, which are given him from time to time as he advances. One night a week a lecture is given to the class by a member of the Master Plumbers' Association, which instructs them in the theoretical part of the business; and the pupils are requested to ask any questions they may think of, which will be illustrated on a blackboard and described accurately to them. The full capacity of the school has been tested; and we could have doubled our number, had we had the room. Forty pupils can be accommodated, but next year some arrangement will be made whereby ample room will be secured for the accommodation of larger numbers. The school was started by the patrons of the North End Mission, and has been under the wing of the Master Plumbers' Association since its conception.

The results at the last exhibition given by the school were more than satisfactory, and reflected great credit on the projectors of the school.

It is an evening well spent to go and visit this school, and see the bright, intelligent, and fine lot of boys who are now coming along, and who in time will advance the business to the position, as regards the journeymen, which has been so much desired by the people who are now carrying on the work.

Much more could be said as to the advancement of plumbing; but we do not wish to weary you with a long paper on the subject, and have merely tried to show you that we, as a craft, are keeping pace with the times in the improvements of this wonderful year of mechanical inventions, and consider that upon the plumber and his work depends a great deal of the health of our community. And, as we keep along, we realize more and more the necessity of good heads, good material, and, above all, the backing of such an assembly as we see here before us, to uphold our profession,—one of which we are so proud, and one which, in the line of improvement, has not been excelled by any other mechanical trade which is now practised.

The extreme modesty of the natural plumber, as usual, steps in here, and prevents me from going any farther on this subject, although volumes could be filled, not as regards the time-worn subject of the plumber and his “diabolical bills,” but on the line of the plumber as a public benefactor to his race, and an arm to the Boards of Health, which cannot be ignored, but rather taken up as of the greatest assistance to you, gentlemen, in the doing of your difficult duties; and you can always rely upon the assistance of us, as a class, to do what we can to advance the good work which has been going on for the past few years, and which we, as plumbers, know will go on under your able management.

THE CHAIRMAN.—Mr. Mitchell's paper is now before you for discussion. I hope Mr. Cosden will have something to say on this project.

MR. JOHN W. COSDEN.—I had not thought that I should be called upon to stand up before a body of men like you and say anything, although I was one of the first who started the Master Plumbers' Association in Boston, and I was one of the first members at the meeting of the Association; and I feel impelled to say that since the Association of Master Plumbers has been established in Boston the trade has been very much elevated, and the shops, the bosses, and the men show that. Before that organization took place, the shops were in back alleys and cellars; but now the plumbers are coming out and establishing their places of business on good streets, in competition with other business. And I think that the Master Plumbers

have done a great work. They started the National Association some thirty years ago, and our first meeting was held in New York; and I think we are one of the strongest bodies of mechanical workers that there are. We number about seven thousand, I believe, all together throughout the United States. In Boston and other cities there has been a wonderful improvement in our work. We try to do the best work, and we have the best interests of the people in mind; and we always feel it our duty, when it is possible, to assist the officers of the Boards of Health to take care of any bad leaks or imperfect drainage that we can find.

If I had thought that Mr. Mitchell was going to send this paper here, without being here himself to speak on the subject, and that I was to be called upon to say anything, I think I could have prepared something which you would have patiently listened to for a few minutes. I could have done it well enough if I had not supposed that there would have been somebody else here to do it instead of me.

MR. J. C. COFFEY.—I do not speak to this subject, of course, from the standpoint of a practical plumber, but rather from the standpoint of an executive officer of a health board, which position I have filled for the past eleven years in the city of Worcester. Up to that time very little attention was paid to plumbing by the Board of Health; and I presume that was true of almost all the cities of the Commonwealth, with the exception of Boston, their work being confined almost exclusively to outdoor matters, — vaults, dirty yards, and things of that kind. I may say that previous to that time there was no man permanently employed by the Board of Health in Worcester all the year round. I was the first to give all his time to the work. I should like to add that I am also a member of the Board of Health of Worcester, contrary to the usual custom of employing agents for executive work who are outside of the Board. About that time we were convinced of the necessity of having something done in the way of drainage and plumbing to the house, and went before the Committee on Ordinances of the City Council, and succeeded in getting the first plumbing ordinance passed in Worcester nine or ten years ago. I think we were the first city outside of Boston to have a plumbing ordinance. About a year after we appointed a practical plumber as inspector, and two years later a second inspector; and those two inspectors and myself formed an examining board, which examined all applicants for plumbers' licenses. That was commenced four years ago; and no man could receive a plumber's license unless he could pass a satisfactory examination before that Board. We reported our findings to the Board of Health, which granted the licenses.

The first State law regulating the practice of plumbing resulted from this work which we were doing in Worcester, one of the master plumbers of that

city being so favorably impressed by it that he went to the legislature, and presented a bill; and the law of to-day is the result of that action. I am in full sympathy with the principles that underlie the existing law; and, although I am not a practical plumber, my record will show that I believe in practical sanitary plumbing. I think that most of the objection to the law which stands on the books to-day is not to the principles that underlie it, but to the details of the law, as they are made up. It seems to me that the law is a hodge-podge. One of the things which I especially object to is that it divides the plumbers into two classes. It makes those who are fortunate enough to have been in the business before the law was enacted permanent, no matter how ignorant they may have been; and a great many men branched into the plumbing trade from tinkering before the law was enacted,—men who are profoundly ignorant of what they ought to know. And they are fixed by the law so that it is unnecessary for them to register but once; while the man who comes and takes his examination, and shows his fitness for carrying on the business, is only granted a license for a year, and must be relicensed every year. In the first class, if a man who is in it violates the provisions of the statute, you can deprive him of his license for a year; while the man who shows his fitness for the business by his examination can have his license taken away for all time. Now, those provisions of the law are incongruous. The man who comes in new, after he is properly admitted, should be put on an equal footing with the man who was in the business before. And all should be required to register every year: there is no other way to keep in touch with them.

There is another thing which I do not like, "that the Boards of Health have the right to fix the pay of plumbing inspectors, subject to the approval of the City Council." The Boards of Health are intrusted by the general statutes with fixing the compensation of employees. Some Boards of Health spend perhaps thirty or forty or fifty thousand dollars a year, and there are no questions asked by the City Council; and yet a Board which is granted the right to spend this large sum must, if they appoint one plumbing inspector at a salary of \$1,200 a year, submit their action in this matter to the approval of the City Council. The reason for this objection must be obvious to every health officer present.

I believe in the principles of the law; and I believe that sanitary plumbing is so important that the State and the local authorities of the cities should exercise a close supervision over it, and that no man should be allowed a plumbing license unless he can show his fitness for the work. With those exceptions I have named, I think the law is a very good one; but I think in those particulars it should be amended, so that those who show their fitness should be put on an equal footing all through, and that those two classes should be done away with. The law says the expenses

which are entailed by the act shall be paid from the revenue derived under its provisions. You will not, after the first year, get much revenue; and that is an inconsistency.

Dr. Durgin suggested that I might say something about the examination of applicants. Our examination in Worcester consists of twenty-five questions, type-written, put before the applicants, and they are obliged to write out the answers; and there is also an oral examination. We have three charts which contain more or less defects which they are expected to see, and give the reasons why, in their judgment, they are defects, and state what they consider the proper way of doing the work. Then there is a practical test. It is rather difficult to make a practical test in an examination of that kind which will amount to a great deal. It must of necessity be something in the way of wiping a joint; and you always have a suspicion that the applicant has drilled himself on the various joints, it being pretty difficult to form any practical test that can be brought into an ordinary examination. We oblige them to pass in practical work a very nearly perfect examination, because, if an applicant knows his business, he will be able to form the different joints in a practically perfect manner, so that, unless they are, as I say, practically perfect joints, we don't consider the applicant proficient. In the written examination 65 per cent., and in the oral 85 per cent., is required for them to pass, the percentage in the written being lower than in the oral, because men may be engaged in business whose early opportunities of acquiring education may have been limited, and those men whose lives have been spent at hard labor are not perhaps gifted with facility of expression; and, therefore, we make the percentage in the written examination less than in the oral. In this way we seek to bring out their knowledge of the trade.

I don't know that I can add anything else to the discussion that will be of value.

DR. B. F. DAVENPORT.—Having been of the committee appointed by the Association last year to take charge of the bill which has been referred to, I can perhaps explain how these objectionable features arose. First, the objection is to two classes of plumbers. It is unfortunate to have two classes, but it has been found practically impossible to get a law passed which does not recognize those who have been in the business a certain number of years. This feature was introduced simply from necessity, not from choice. The objection is raised that the first class is composed of those who were fortunate enough to have been in the business, and that their licenses cannot be revoked. If Mr. Coffey will read Section 8 of the Act, he will find that it is provided that those who hold licenses who do anything in violation of the regulation cannot continue their business. This applies to those who hold licenses and those who hold certificates of registration.

Another objection is the provision limiting the inspector to a certain amount of pay fixed by the Board, but to be approved by the City Council or Board of Selectmen. That was another necessity. A member of the House, Mr. Esterbrooks, of Newton, objected seriously to the bill as drafted, and said he would defeat the whole thing unless that amendment was admitted; and it was under those conditions that it was.

MR. COFFEY.—I know you cannot make a law which will legislate out of existence men who are in the business and whose capital is invested there. The objection I made was that the men who are admitted, who were not in the business before, are not put on an equal footing with those who are already in; that the men who are newly licensed can have their business taken away from them; their licenses can be taken away for good. That I object to. All you can do with one class is to deprive them of their business for a year; with the other you can take away their licenses for good. Now, the man who goes into this trade and shows his fitness for it should be put on an equal footing with those who are already in; and there should not be these two classes. That is the point I object to in this law, that after these men are in they are still divided into two classes, and under the law will continue to be so divided.

DR. DAVENPORT.—A licensed man can be deprived of his license, but there is nothing to prevent his applying for a new license afterwards. A man who holds a certificate of registration can be deprived of it for a year; and, if he does not comply with the regulations, he can again be deprived of it for another year. Thus every man who does not do his duty can be stopped from carrying on the business.

DR. DURGIN.—How does the percentage of those who are able to pass examination this year compare with that of the first year of the examinations?

MR. COFFEY.—We have made the examination we instituted a little more stringent than we did under the old system. We didn't have the practical examination formerly. That is provided by the statute. At first our examination consisted of the written questions and the chart. I suppose that what is true of Worcester is perhaps true of other cities, except Boston. After all, we do not have so many applicants for examination. We have not had, since the law went into effect, perhaps more than twenty. In Boston you would have to multiply that by five, or ten, perhaps. In Worcester the men who are in the business have been there for years, and will continue in it; and the natural increase is not large, and our revenue that we derive from it after the first year is very slight.

DR. DURGIN.—I mean what is the percentage of those who pass?

MR. COFFEY.—About the same. The journeymen are mostly young men who come before us for examination.

DR. DURGIN.—There is one interesting feature of the examinations for plumbers' licenses. In Boston I find the percentage of those who pass examination successfully now is very different from that which obtained during the first year. I think that during the first year of examinations here not more than 40 per cent. were able to pass a reasonable oral examination; while during the past year not less than 80 per cent. have been able to pass the same examination. It is also a notable fact that the young men who are coming in for examination now for a journeyman's license are showing much better qualifications than the older men who are applying for licenses as master plumbers. Men who drifted into plumbing years ago without qualifications, and who as builders carried on the business of plumbing, usually fail to pass the examination.

DR. DAVENPORT.—I should like to ask Mr. Coffey if he is accustomed to require more of a master plumber than of a journeyman in the examination.

MR. COFFEY.—In Worcester we oblige the master plumber to draw certain plans and make sketches, not necessarily drawn to scale, but to show more proficiency than the journeyman shows.

DR. DAVENPORT.—How about the inspectors?

MR. COFFEY.—We have not increased the inspectors since the law went into effect. We had two when the law took effect.

THE CHAIRMAN.—If there is nothing more to be said on this paper the next matter for our attention is a talk on anti-toxine by Dr. Ernst.

ANTI-TOXINE.

BY DR. HAROLD C. ERNST.

Mr. President and Gentlemen,—What I have to say this afternoon will be distinctly a talk, not a formal paper; and I hope that, if I do not explain everything that you would like to know, you will question me, and I will answer to the best of my ability. Dr. Durgin asked me some ten days ago if I would be willing to appear here; and, of course, I expressed my readiness to do so, and to explain as well as may be what this so-called anti-toxine of diphtheria is, and perhaps to give some sort of guess of the methods by which it works. But, in the first place, before I can attempt to tell what it is,—for very few of us know exactly that,—I think you should understand the difficulties which there are in the way of preparing it, and know something of what the process is, and the reasons for it.

In the first place, before one can produce anti-toxine, he must procure the toxine of diphtheria. The toxine of diphtheria is a fairly well-known substance that is produced in cultures of the bacillus of diphtheria in the laboratory, and not only there, but also in the living body during and after every attack of diphtheria. The toxine of diphtheria is the active factor in producing the worst later symptoms of the disease, leaving an especial action upon the nervous centres, and, as a result, producing the unfortunate sequelæ of diphtheria, the paralyses of the soft palate and of various regions of the body. This toxine, after a long series of experiments, was shown to be produced, as I have already said, by the cultures of the bacillus of diphtheria, as they are carried on in the laboratory. And the result of the work that has been done shows that this toxine is produced in varying degrees and amount of intensity by different cultures, or rather by cultures of bacilli of diphtheria coming from different sources. That is one of the peculiar effects that has to be recognized, and is one of the causes of the long time necessary to produce anti-toxine. In cultures of the bacilli of diphtheria coming from two cases that appear to be of equal degree of malignancy, or a culture coming from a case of extreme malignancy and one coming from a case of apparently mild type, the chemical manifestations may or may not have the same degree of virulence in each instance. There are some cultures of bacilli of diphtheria from different sources that have the peculiarity of being what are called good toxine producers; and this is the first step in producing anti-toxine,—to secure a good toxine producer,—because, before one succeeds in producing anti-toxine, one must have the toxine.

Now, the way in which one goes about it is to obtain, if possible, a culture of the diphtheria bacillus that upon inoculation into guinea pigs will

kill those animals within a certain limited time, the extreme limit being forty-eight hours. And, if death can be produced in less time, so much better is the prospect of getting a good toxine producer; but this is not certain at all. Having secured this culture, the next step is to develop it in what is called nutrient bouillon, consisting of a watery extract of meat which has been boiled, the coagulable albuminous material removed after boiling, and certain proportions of salt and peptone added to it.

Then there are two ways of procedure. One is that of the French that has been devised by Roux and Yersin, which consists in the placing of the cultures of diphtheria bacillus in this nutrient bouillon, in an apparatus where they may be maintained at a temperature of 37.5° C., and so arranged that a constant current of air may be passed over them, so that there will be a constant supply of oxygen, and also a supply of moisture, in order that there shall not be undue evaporation. Now, the reason of taking so much trouble is because the toxine produced by the culture of diphtheria in this bouillon is formed more rapidly under these conditions, while under the ordinary conditions in the incubator the toxine is produced in ten or twelve weeks or more. This method of passing the air over the material reduces the time necessary to produce it to about three weeks. This is the method which has been adopted in the preparation of the toxine by me for the Boston Board of Health; and I have here a diagram of the incubator used for producing it which has been specially constructed, and which will show what is going on at the present moment in the laboratory. This diagram shows the outline of the incubator, which is kept at a proper temperature by a small burner underneath supplied by gas passing through the regulator,—that part is according to the ordinary method. In the interior are these flasks, each of which contains a small amount of nutrient bouillon and the culture of the bacillus of diphtheria. There are tubes and other flasks in which are growing cultures of various degrees of virulence. There is a recording thermometer, giving us the exact temperature night and day. The wall on one side is perforated by brass tubes which run into the body of the incubator, and each of which has a stop-cock on the outside. There are twelve of these, four upon each shelf of the incubator. They are all led into one tube finally, which passes overhead, and is connected with the water supply through a filter-pump which, by a very small stream of water, draws the air through these tubes. And we can see how fast the air is running through each of the flasks by means of flasks filled with sterilized water, which also furnish the moisture. Now, each of the brass tubes passing through the outside of the incubator is arranged to have connection with six flasks in the interior. Each series of flasks may be cut off from the outside, and each individual one can be cut off by a pinch-cock. The apparatus, of course, had to be got up rather hurriedly; but I have not

seen anything that has worked more perfectly than this since it started: it seems to serve the purpose exactly. The door is of heavy plate-glass, and over it is placed a curtain; for cultures, as a rule, grow best in a dark chamber rather than in one exposed to varying degrees of light. The cultures are grown in flasks which have two tubes passing through the stoppers. One goes close to the bouillon, taking the air to the culture; and the shorter tube is simply the exit.

The cultures, having been started in the incubator, are cultivated for at least three weeks; and then it is not simply the process of taking them out and getting rid of the bacilli, and starting with the animals, whatever they may be, but one must get the toxine to a certain degree of virulence. It is of no great use to begin these experiments until one reaches that point where the material is spoken of as normal toxine, which means a toxine produced in this way, and of such a degree of strength that one-tenth of a cubic centimetre will kill a guinea pig weighing five hundred grams within thirty-six hours. One must reach that degree of strength of toxine. Having arrived at such a point with the culture that the toxine should be about ready, the next step must be to take these flasks,—such as I have shown you,—and pass the fluid, which is full of virulent and dead bacilli, through a filter of unglazed porcelain. We have a special filter for that. The toxine, having been passed through this unglazed porcelain filter, comes out as a perfectly clear fluid, amber-colored, and entirely free from any bacteria at all: the bacilli are left behind. Then it must be tested, to be sure that it reaches, or perhaps surpasses, this standard which I have given you, which is that one-tenth of a cubic centimetre will be sufficient to kill a guinea pig weighing five hundred grams within thirty-six hours.

Then only is the next step to be begun,—the preparation of the anti-toxine in the animal that has been selected. The horse has been chosen for the purpose of producing the anti-toxine for several reasons. The same results can be obtained with almost any animal: but the reasons for employing the horse are, in the first place, that he is less susceptible to the poisonous effects of toxine than other animals, which are apt to die when least expected, or to become dangerously ill while undergoing immunization, so that the work done upon them may be all thrown away. This is true to a less degree of the horse, and to so much less a degree that the horse was considered safer to use. In the second place, horses furnish a much larger proportion of serum, and can be bled oftener than the other animals; and so they are less expensive.

The operations through which this immunity and the anti-toxine are obtained are delicate and prolonged, and may fail at almost any stage. The shortest time in which complete immunity has been reached that I know of is eighty days, the longest, eight months; and one cannot tell what kind of

a horse one has got, and how long it will take to immunize him until the experiment is completed.

The method of immunizing is by the use of toxine subcutaneously, beginning with small doses, gradually repeated, the dose increasing in size until by experiment it is found that the stage of immunity has been reached. The process is something like this: the initial dose is one-half a cubic centimetre injected subcutaneously; and even that small quantity, if of normal strength, must be guarded by a mixture of iodine and iodide of potash. The results of the first inoculation are watched with much care, because upon them must be based further procedure. The use of the mixture of the gram solution is found to have less dangerous effects than the plain toxine. The proportion is about one-third in bulk of this mixture of iodine and iodide of potash and about two-thirds of toxine. Of that mixture on the first day there may be injected half a cubic centimetre. The result is usually fever, some local œdema, and some general disturbance of the horse, which passes away in two or three hours. Two or three days after a second injection of the same mixture may be given. It may be of the same size or slightly increased, and it may be repeated at intervals of two, three, or four days, never as often as every other day; say two, at the outside three times a week; sometimes at intervals of eight or ten days. This procedure is carried on until it reaches into the thirtieth or thirty-fifth day, when the dose should have been increased to such a size that thirty-five to sixty cubic centimetres of toxine may be injected at once without any more reaction, and even less, following than was produced by the injection of half a centimetre at the first. Such injections may run up to quantities as large as two or three hundred centimetres, and yet produce no marked result, no fever, œdema, or special trouble of any kind. Then only can one feel that one may have reached the point of immunity; and then only can one feel that this anti-toxic serum may have been produced for which one has been working for so long a time.

Now, the anti-toxine is contained in the blood serum of the horse. Precisely what it is I do not think anybody can explain. It may be, as some claim, the result of the increased activity of the nuclei of the various forms of tissue cells in the body. It may be produced by retrograde metamorphosis,—exactly what it is not definitely known. As far as regards toxine, there is something known about that, as was first shown by Wassermann and Proskauer. It is a definite body, and has definite characteristics, which seem to indicate that it is one of the proteids.

Then the question is, What does anti-toxine do? It is not, apparently, as shown by the experiments of Roux, a direct chemical antidote to toxine. This is a natural suggestion, that when one introduces the serum obtained by this process from the animal, and diphtheria ceases, what has appar-

ently been done is to introduce a direct chemical antidote to toxine; but that is not so, and the most recent explanation of what anti-toxine does in the cure of diphtheria,—because it is not open to reasonable doubt that it does act in that way,—the most recent explanation is the supposition that it produces an increased cellular activity, making the individual cells of the body more resistant to the toxine. That is a tentative explanation, but it furnishes a working theory.

Now, in regard to the dose. When the use of it first began, it was necessary to have some standard upon which to base the question of dosage. There have been half a dozen different standards given. The same man has started at least three different ones, so that the confusion which may arise is a very natural one in the minds of those who are reading the literature. I have tried to put down here very briefly, and I think clearly, what the most easily understood basis of dosage is and should be. In the first place, as I have said, the normal toxine is the toxine of which half a cubic centimetre will kill a guinea pig weighing five hundred grams in forty-eight hours. The standard anti-toxine is that mixture of one-tenth of a cubic centimetre of anti-toxic serum added to nine-tenths of a cubic centimetre of normal toxine, making one cubic centimetre in all, which may be injected into a guinea pig of five hundred grams' weight without producing any effect,—in other words, the one part completely neutralizing the nine parts. If you multiply that out a little, you will see that one cubic centimetre of such anti-toxine will neutralize nine cubic centimetres of toxine in five thousand grams of guinea pig, or will immunize that weight of guinea pigs. There you get a basis for dosage of human beings. If one cubic centimetre will immunize five thousand grams of guinea pig or of human beings, it will immunize a baby weighing from six to seven pounds; and for a person weighing more you multiply the number of cubic centimetres in proportion, and, to leave a margin of safety, the dose is increased a little. But it must be remembered that in practice we are peculiarly dependent upon the absolute honesty and accuracy of the producer of the material.

As to the future, it seems to me exceedingly promising. In the first place, if the anti-toxic serum of diphtheria proves successful, the next step in advance will be the complete isolation of the anti-toxine; and we shall be able to use it in small doses, precisely as we use morphia and other substances to-day. If there are any questions to be asked, I shall be glad to answer them.

THE CHAIRMAN.—Professor Ernst's remarks are before the Association; and it is to be hoped we shall have other remarks and questions submitted to Dr. Ernst, for the gratification of those who are interested in this subject.

A MEMBER.—How is the serum produced? In what manner is it drawn from the horse?

DR. ERNST.—That I meant to have spoken of. It is drawn from the jugular vein. It does not require any very severe precautions. The blood is drawn with an ordinary canula, which has been washed with alcohol and ether, and is received in flasks plugged with cotton wool, and previously sterilized. The blood is allowed to clot; and, where the serum is separated, it is drawn off into sterilized pipettes. The time it is safe to keep it is not settled; but it is considerable,—weeks, perhaps months. It must be placed in vessels completely filled, to which have been added one-half of one per cent. of camphor. The toxine and anti-toxine both lose their power after a considerable time, but very slowly. How long is not definitely determined. It is a matter of weeks and months rather than of days; and there is no practical danger of putrefaction, though the serum must be preserved very carefully, or there may be unfortunate results in the future, which will be sure to be attributed to the material itself rather than to the handling of it. The material appears to be giving all the results that have been claimed for it. I have this week received a letter from one of my former students, written from Berlin, in which he says that Kossel claims that they have not yet lost a case of diphtheria that has been treated in the first or second stage of the disease.

A MEMBER.—What length of time is to be allowed between the different administrations of the remedy, if it needs to be repeated?

DR. ERNST.—In human beings the average is two doses, with about twelve to fourteen hours' interval. If the case has been so far of a bad type, showing malignant symptoms, affecting the bronchii, the dose may be doubled. If the case be handled in the first or second stage, before very malignant general symptoms have appeared, two doses are usually sufficient. I believe the first case treated in this neighborhood was by Dr. Rogers in Dorchester, in October; and its history is a very striking one. It was a case where the membrane had formed over the soft palate, and involved the pharynx and larynx. Within three hours after the first dose the membrane was manifestly loosened at the edges; and after the repetition of the dose the next morning the membrane came off in twenty-four hours, and never re-formed. It was a case which, under ordinary conditions, might have been expected to result in death within twenty-four hours. The child is well to-day.

DR. GARDNER T. SWARTS.—The subject as explained by Dr. Ernst has

been put exceedingly well, and is one which is going to be of extreme interest to boards of health throughout the country, as evinced by many of the boards taking the control in the disposition of the material by placing it where it can be dispensed to physicians; and, as the control of it in that way brings it to the attention of health boards generally, it is therefore of more interest to this society than the therapeutic detail. This matter of the anti-toxine of diphtheria is, of course, similar in its relations to what we have had in connection with other toxins and anti-toxines in other diseases; and it is not necessary to refer here to the immediate application of those. The application of this material is not only theoretically, but scientifically, correct; and, practically, the result of the experiments made by those who have used the material shows that the material does bring about that which has been expected of it. A question to be decided at present is the amount of material required in given cases. There is the well-known division of cases into the first, second, and third stage,—a distinction difficult to make in an arbitrary way, but it can be made for practical purposes, and in those different conditions different doses will be required; and as to what those doses shall be should rest with those who dispense the material, with the health boards or those who have control of it. The experience in Rhode Island has been thus far fortunate in the way of the control of the material. That which has been used has been introduced from the Pasteur Institute of New York; and through the kindness of the firm having control, Lehn & Fink of New York, no material was supplied the local druggists unless recommended or approved by the City Board of Health of Providence or by the State Board of Health. In that way the history of the work accomplished by every bottle that came into the State could be known; and it could be known that no false material came into the State. The details of all cases could be obtained. The anti-toxine was dispensed to such physicians as supposed they had actual cases of diphtheria; and a complete history of each case has been kept and the results noted. If every Board of Health would follow out that same course, we should have a mass of material which would be of immense service to the practitioners who will doubtless use this material as their chief remedy.

There are two or three questions I should like to ask of Dr. Ernst. First, as to the value of different products now on the market. There are the Behring product, the French product, and others,—some available, and some not. The Pasteur Institute sends out its material, with the legend attached "immunizing power, 1 to 50,000," while the Behring solution is supplied in three strengths,—1 to 600, 1 to 1,000, and 1 to 1,500; but as to the comparative values I am at a loss, and I should like to inquire, in order to obtain some information, as to which product is to be preferred, and how the dose of one compares with the dose of another.

DR. ERNST.—I am afraid I shall have to decline to answer that question. I do not think it is fair for me to be asked to express an opinion. I can say this: I believe the Boston Board of Health has taken the proper course; that is, to make it itself. We have a very large community, and should have this matter under our control. If the smaller communities cannot make it themselves, I think they should combine; and I hope the Boston Board of Health will agree that, in case we shall have so large a supply that we can afford to do it, we will supply the smaller communities, if necessary, at cost of production. As to guaranteeing anybody else's product, I should not think of it, particularly in this material. I would not consider it a moment. Neither would I recommend any special one. I would recommend the use of the anti-toxine for diphtheria, but I don't think I should be called upon to name any particular product.

DR. SWARTS.—Is there any way of interpreting the values of the different products?

DR. ERNST.—Those of New York are based upon the standard I mentioned, I believe. The Behring and others are based upon the German standard; and, as Behring has already had three standards of nomenclature, I do not know how many more he will have before he gets through. You must take the directions that come on each bottle.

PROFESSOR T. M. DROWN.—How much serum is obtained, and is the horse bled more than once?

DR. ERNST.—The horse may be bled indefinitely. Roux has been bleeding one for three years. They are bled about once a month, and furnish from one to three litres. That involves the question of maintaining the degree of immunity which the horse has attained, whether it is to be done by an injection, after the first bleeding, of a large quantity of toxine or whether the immunity is to be maintained by repeated doses of a smaller quantity. These differences of manipulation are shown by the differences which occur in different methods. The French never inject at one time more than 250 centimetres of toxine. The Germans have been seen to inject 4 litres in bulk; but, whether it is toxine pure or toxine mixture, I do not know.

A MEMBER.—What is the mixture?

DR. ERNST.—Nobody knows.

A MEMBER.—What is the mixture of the normal anti-toxine for injection? What is the vehicle?

DR. ERNST.—It is just itself.

A MEMBER.—In a case of malignant diphtheria would the doctor separate the other children or wait until they have an attack? Would he inoculate the other children with the anti-toxine?

DR. ERNST.—The routine thing is not only to treat the patients who

have the disease, but the injection is made, as a matter of course, with all the persons who have been exposed before the symptoms appear. That reminds me of a curious fact. The immunizing of animals was secured four or five years ago by Fraenkel, Kitasato, and Brieger. The first paper upon the subject came out four years ago last fall, and that immunity was obtained by the continued use of toxine before the anti-toxine was known. Immunity is practically obtained now, but the two immunities are entirely different. Immunity after the use of toxine is slow in coming, difficult to obtain, and dangerous; but it is permanent. Immunity obtained by anti-toxine is easy to obtain, but is very fleeting, only lasting about two weeks. That is a very curious difference.

THE CHAIRMAN.—Professor Kinnicutt, have you a word to say?

PROFESSOR L. P. KINNICUTT, of Worcester.—I have been very much interested, but I know nothing absolutely about the subject. I have learned a great deal from the remarks of Dr. Ernst, and I express my personal thanks to him for his illustration of the matter.

DR. J. A. FITZHUGH, of Amesbury.—I represent a small community free from diphtheria, and I hope it will continue so; but I may have a case. I understand that the Boston Board of Health is not prepared to furnish us with anti-toxine, and that the available material is the French, or from Pasteur's Institute in New York. In a case of necessity what ought we to do at the present time?

DR. ERNST.—I should not suppose it would be possible to supply the entire demand for this article at the present time. If I were sick or had a case to treat, I should take the first supply I could reach, and trust to that.

DR. SWARTS.—Is there any one present who has used these different anti-toxines? and has the experiment shown a satisfactory result, as indicating whether the anti-toxine which is supplied by the Pasteur Institute, or that of Behring or Schering, is to be preferred?

THE CHAIRMAN.—I am told that Dr. French, of Clinton, has had some experience with anti-toxine; and we shall be glad to hear from him.

DR. C. L. FRENCH, of Clinton.—I have had a little experience in the use of anti-toxine. As soon as I knew it could be obtained in this country, I ordered a supply from the New York Institute, with instruments for using it; and within three days' time I had a case,—a child, five years old, who had a very suspicious membrane in his throat. I made a local application to the throat, and within twelve hours the membrane was almost entirely gone. The patient continued comfortable; but the membrane returned, and a second application removed it as before. Two or three days afterwards symptoms of croup developed, and those symptoms became very severe; and I considered that it was a case of membranous croup. The

child was growing worse, suffering from difficulty of breathing. Then I decided to try the anti-toxine, which I had just been able to procure. First I took a culture from the throat, and sent it to Dr. Ernst. I injected at four o'clock in the afternoon fifteen cubic centimetres of anti-toxine, and from what I had known of it I didn't expect marked results under twenty-four hours. I expected to have to perform tracheotomy on the child; but at 7.30 that evening it was evident to me that the child was breathing easier. There was a little rattle there which I didn't get before: there was an elevation of temperature which I expected. The child grew no worse. He was not markedly improved, but it was evident he was getting no worse.

In twelve or fourteen hours after I injected ten cubic centimetres, making the whole number twenty-five. The child had a very hoarse cough, and I didn't feel entirely at ease about my patient. In forty-eight hours after the first injection he had grown no worse, and there was a little improvement. After that the improvement was more marked; and he made a perfect recovery, and is now well. When I took the culture, there was no membrane to be seen, and it seemed to me doubtful if I should get a report of "diphtheria"; but the report came from Dr. Ernst that it was a case of diphtheria. So, while I took from the throat material that showed no appearance of membrane, it seems he had the bacilli of diphtheria there; and it seems to me that no greater proof is needed that diphtheria may develop into membranous croup. Within a week or ten days I had a second case of croup, which, it seemed to me, was of a membranous character, though there was no membrane in the throat; and this was in a family where I had six weeks before performed tracheotomy for membranous croup on a child who afterwards recovered. The other children in the family were sent away at once to another house; and they afterwards developed sore throats, which had a look of diphtheritic character, but it was very mild, and they both recovered. But this second patient developed membranous croup, and the case was getting so bad I decided to treat him the same way. I took a culture which I sent to Dr. Ernst. My second patient had very much the same experience as the first. He was growing constantly worse, and I gave the injection of anti-toxine; and I gave a second injection in twelve or fourteen hours, as in the first case, and in two or three days the breathing was satisfactory, and he made a good recovery. But my report upon this second case to Dr. Ernst was that no bacilli were found. That is all I have to say about those cases.

I should like to ask Dr. Ernst what are the chances of our missing a correct diagnosis; whether on taking one culture from the throat, and on examination bacilli are not found, it is pretty positive proof that there are none there. I sent a culture yesterday from a case which, it seemed plain to me, was one of diphtheria; and I received a report to-day that it is not so.

Now, I suppose it is not ; but I should like to ask that question. Perhaps I am not very expert in taking a culture, but I should like to know what the chances are in taking a culture of making a miss of it.

DR. ERNST.—In nine cases out of ten the method is more accurate than the clinical examination, but there are chances for error that it is almost impossible to guard against. Before I would advocate this method for general application, during my work with Dr. McCollom in my laboratory last year we carefully studied the whole subject, and asked for cases of sore throat where diphtheria was not suspected, and with the very purpose of determining how accurate this method of diagnosis might be made. As the result of that year's work, something like 800 cases were submitted to us for examination, and of them about 125, I think, were diphtheritic, and we learned a great deal ; and the first thing was that, if this method is properly followed out, it is very accurate. I don't know whether the directions that are printed on the boxes that are sent out are definite and clear, and, if they are not, we should be only too thankful to get suggestions ; but, if they are followed, it seems to me the results are very accurate. We have had cases sent to us where we have not found bacilli, and on the second examination we found them. A culture was sent within a fortnight that was negative, and the case died. Before the case died, the culture was said to have been made as accurately as it could be. It was made by a gentleman working in my laboratory ; and, if he did it properly, I should not feel it was a case of diphtheria. The second point last year's work appeared to confirm was this : that there may be a formation of membrane or there may be none, the case following the exact clinical course of diphtheria, where it is *not* true diphtheria. If we take as the standard that disease which is produced by the bacillus of diphtheria,—and that is what we are working upon now,—that other bacteria may produce similar symptoms I think is true, but not common. As to treating those cases with anti-toxine, the practice in diphtheria hospitals in Berlin is not even to wait for the culture diagnosis ; but every child that comes in is treated with anti-toxine. It does no harm ; and, if it is a true case of diphtheria, no time is lost.

There is another little point which has created some criticism ; and that is the method of making these cultures which we have adopted, by the use of the platinum wire, and not the cotton swab. We sought to determine the advantage of one over the other ; and we came definitely to the conclusion that the platinum wire is the best thing, though somewhat more trouble to use, for the reason that with the cotton swabs we tried some of the cultures we got gave a negative result. The reason appears to be this : that the cotton swab may be several hours in being transported, and the material may get inside of the meshes, and it takes time to get it out again ; and, in the second place, the wire takes a smaller quantity (at the same time all that

is necessary), the culture is made at once at the bedside, and the growth begins then, if it begins at all. It begins then, and there is less chance for an obscure result. So it appears to me that the wire is the best thing to use.

A MEMBER.—We have only been using it for three weeks. I am the agent of the Board of Health, and what the physicians have told me is this: We have furnished in all some eleven bottles for cases that have occurred this year. Four were serious ones: the physicians told me they were in a very bad way. We have had no deaths whatever: the four bad cases entirely recovered. The hospital had three of them, and the clinical record there is very interesting. The only unfavorable result which has been noticed from the use of anti-toxine furnished by the New York institute has been a slight case of heart disturbance. That was the effect of its use on one of the nurses. A slight attack of heart trouble was experienced, but other than that nothing of the kind.

DR. ERNST.—One of the Newton physicians tried it on himself, and it had the same effect.

DR. S. W. ABBOTT.—I should like to answer a question that has been asked as to how this material may be procured in the future. The State Board has already initiated the proper procedure for producing anti-toxine. It has been at work for several weeks. We have five horses under treatment, and we hope to be able to issue the material to those Boards of Health that may require it. Just how it will be issued and how soon it may be ready I cannot state.

DR. J. E. CLARK, of Medford.—I will mention the case of a woman fifty-five years old, to whom anti-toxine was given. She had been suffering several days with a severe laryngeal diphtheria. At the time of the administration of the serum there was decided improvement as to the throat symptoms, the membranes having nearly disappeared; but the heart action was weak. Accordingly, 15 centimetres of the New York (Pasteur) preparation were used. The next morning, twelve hours after this treatment, the patient was visited, and found greatly improved in every way, a speedy, uneventful recovery following. As this person was very enthusiastic as to the efficacy of serum treatment, the question arose how much of the results manifested was due to anti-toxine and how much to "suggestion."

Several members of the family of this patient were immunized. No unpleasant effects followed.

As to the value of taking cultures: I had a case of diphtheria in the latter part of December. The diagnosis of the disease was made by the usual methods of inspection, etc. The patient, a lady, having a nursing child about six months old, was advised to send him away as a matter of precaution. Before returning, a culture was taken, although the patient was apparently well, and her throat had been perfectly clean about a week

or ten days. The test revealed the presence of diphtheritic bacilli, and the parents advised against the return of the child till the cultures should prove negative. In a recent case of obstetrics one of the children in the family developed a sore throat of a very suspicious aspect. To absolutely determine its nature, a culture was taken, proving negative. By this measure much anxiety was quickly allayed.

From what I have stated the culture test is necessary in making absolutely certain diagnoses of the existence or not of diphtheria. My attention has been called to cases with simply running at the nose, but afterwards were found to be diphtheritic. In such the culture test is demanded.

I think physicians, particularly boards of health, should require cultures to be taken in all cases where the disease has existed previous to permitting school children of the infected premises to return to school, and the parties affected going about and mingling with the public.

MR. COFFEY.—I should like to instance a case which occurred at Worcester. It was that of a child three years of age, who had laryngeal croup. Two or three cultures were made, without finding Klebs-Loeffler bacilli. The child subsequently died, and an autopsy was performed, and cultures taken from various organs of the body; but the subsequent examination failed to show the diphtheria bacilli. Streptococci were found in large numbers, however; and, in the opinion of our bacteriologist, death was due to that cause.

DR. DIKE, of Melrose.—I should like to ask Dr. Ernst if other measures are advised in addition to the use of anti-toxine; the usual measures.

DR. ERNST.—The routine is nothing but supporting treatment.

DR. DIKE.—You would not advise any other measures?

DR. G. T. SWARTS.—It has been stated in some of the foreign articles upon this subject that the use of carbolic acid or corrosive sublimate as a gargle or application to the throat was objectionable, inasmuch as it might neutralize the action of serum. I have had experience in injecting the serum in but fifteen cases. In ten of these the examination of the sections from the throat showed the presence of the Klebs-Loeffler bacillus. Four of these cases were of the severe type; that is, the membrane had extended into the larynx and nares, accompanied with extreme prostration and short and rapid breathing and that ashy, waxy look which appears in the severe cases. The results in these cases were most gratifying.

In the recommendation of Dr. Ernst that a platinum wire be used, and inserted under the membrane, it has seemed to me that by the previous heating of the wire for the purpose of sterilizing it, in the presence of the patient, especially in the case of a child, will make it difficult to convince the patient that the wire has cooled.

In the case of a struggling child, or where only a quick, hasty examination of the throat can be made, the physician will be more successful in obtaining the secretions from the back of the throat with the use of the cotton swab, which has been sterilized in a test tube before being delivered to the physician.

The use of the swab precludes the possibility of doing injury to the mucous membrane, and the physician will feel freer to search about in the pharynx than with a sharp wire. To the objection to the swab suggested by Dr. Ernst, that the organisms dry up in the meshes of the cotton, I would say that it is presupposed that the culture is made at once upon a serum tube sent with the swab in the same box. This is the method adopted by the Board of Rhode Island, and is copied from the practice of the Boards of Health in New York City, Brooklyn, and in the District of Columbia.

Our Board, as also that of the city of Providence, has thus far supplied the serum, free, to all cases where the patients were unable to pay for the same, and have also supplied or loaned the syringe, the first injection, wherever practicable, being applied by a member of the Board. In this way there has been no delay in applying the material either for supply or for want of instruments,—an essential feature in a disease which does not wait for the movements of the physician.

It was moved and seconded that Dr. Ernst receive the thanks of the Association for his able and interesting remarks, and the notion was unanimously carried.

The meeting was then adjourned.

PHYSICIANS' RETURN OF DEATH.

(Omitted from Report of October, 1894, Quarterly Meeting.)

REMARKS OF DR. JAMES B. FIELD, OF LOWELL.

It is fortunate for the reputation of Lowell physicians that Dr. Fox did not have on his desk a list of our death returns when compiling his paper. In looking over the causes of death in Lowell for the past fifty years, I found several ludicrous returns, of which I can now recall only the following. In one case "earache" is given as a cause of death; in another case, at the time when there was strong feeling between different schools of practice, "homœopathic foolery" is the cause given in the certificate; in a third case the physician, more honest than most of us, inadvertently signed his own name as the cause of death.

Even now we have in Lowell some physicians who never have a death from phthisis. They sign the return "plastic bronchitis," whatever that may mean. Other physicians never lose a case of typhoid fever, but they have deaths from hemorrhage and peritonitis. I believe that this word peritonitis, when used for the female, often covers up cases of criminal abortion.

In order that we may have fewer of these meaningless death certificates. I offer the following resolution:—

Moved, to ask the committee on vital statistics to report a list of common terms used as causes of death which Boards of Health should not accept, and to formulate a certificate which shall be recommended for general use throughout the State.

Mr. Parker, of Cambridge, moved to amend the first motion by the following:—

Moved, that the committee on legislation be requested to prepare and submit a draft of additional legislation on the matter of death certificates which shall embody at least these two provisions.

1. The power in the Secretary of State to prescribe from time to time a form of death certificate, the uniform use of which shall be required throughout the State.

2. The power in local Boards of Health to require, in cases where the certificate of the attending physician is not satisfactory to the Board, a cer-

tificate from the Medical Examiner, who shall have the right to make autopsies in cases where he deems it necessary.

The motion as amended was seconded by Dr. Swartz, and passed.

NOTE.—In the January number of *THE JOURNAL*, containing the records of the October meeting, there is a mistake on page 14 to be corrected. Mr. Parker had just finished reading his paper on "Certain Needed Legislation," and Mr. Coffey asked him this question:—

"I should like to inquire of Mr. Parker through the chair if I understood him aright in saying that we have no authority to remove small-pox patients."

Mr. Parker's answer should have been printed thus: "You did to this extent; namely, that, if a patient resisted removal, we probably ought to apply for a warrant."

JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

April Quarterly Meeting
1895

SUBJECTS: Sewage Filtration and Municipal Sanitation; Purification of Garbage-polluted Waters by Sand Filtration; Chemical Purification of Sewage Water; Disposal of Household Garbage.

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are three dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

P.O. Box 2510, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. V.

June, 1895.

No. 2

APRIL QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly meeting of the Massachusetts Association of Boards of Health was held at Brockton on Thursday, April 25, 1895. In the morning the members visited the Pumping Station and Filtering Beds of the Brockton Sewerage Works. In the absence of the President, Dr. Samuel H. Durgin, Vice-President, occupied the chair, and at the close of the dinner, at the Hotel Belmont, called the meeting to order at a few minutes before four o'clock, and introduced the Mayor of Brockton, as follows:—

We are favored this afternoon with the presence of the chief executive officer of the city in which we meet. I take pleasure in presenting to you his Honor Mayor Whipple, of Brockton.

ADDRESS OF MAYOR WHIPPLE.

Mr. President and Gentlemen,—It certainly affords me a great deal of pleasure to extend to you in behalf of the city of Brockton a most cordial welcome on this occasion. In the limited time which has been allotted to us we have endeavored to show you the system of sewerage adopted by our city, one which we believe compares favorably with that of any other inland city of the Commonwealth; and I cannot at this time fail to speak in the highest terms of the ability and energy with which our work has

been carried forward to completion under the direction of City Engineer Snow. The financial and business management from the conception of the work to the present time has been ably conducted by the Board of Sewerage Commissioners; and now it seems to me that all that remains is the co-operation of the local Board of Health in compelling those abutters along the line of the sewer to connect with the same, and we have ample assurance from them that we shall have their co-operation in this matter.

Now, Mr. President, Brockton is emphatically a shoe town. Without wishing to be too boastful, I will mention the fact that we produce more shoes than any other city in the world. I am aware that that statement sounds large; but during the past year our output was more than \$22,000,000 in value, or, in other words, one-fifth of the entire production of shoes in the United States. Now, Brockton is always ready to lead, but never willing to follow. We believe that we have a sewerage system inaugurated here which will lead in the Commonwealth, to say the least. At all events, I hope so. And now I assure you, Mr. President and gentlemen, that the local Board of Health, the Sewerage Commissioners, and the Engineer fully appreciate your attendance here to-day; and again I bid you welcome.

The Chairman then called upon the Secretary to read the records of the last meeting, which were accordingly read; and the Chairman said that, if there was no objection, the records would stand approved. Dr. Ripley suggested that the name of Mr. Cary, of Brockton, be substituted for that of Mr. Lampear; and the suggestion was accepted by the Secretary.

THE CHAIRMAN.—The Executive Committee have the following names of gentlemen to report as candidates for admission as members of the Association:—

T. J. GARRIGAN, M.D., North Brookfield.
E. R. COGSWELL, M.D., Cambridge.
H. P. JAKES, M.D., Milton.
C. MINOT WELD, Milton.
THOMAS N. PERKINS, Milton.
CHARLES A. HICKS, M.D., Fall River.
M. A. CUMMINGS, M.D., Fall River.
L. P. DEGRANDPRE, M.D., Fall River.
THOMAS JORDAN, Boston.
JAMES E. SEAVER, Taunton.
C. E. LOVELL, M.D., Whitman.
N. K. NOYES, M.D., Duxbury.

What is the pleasure of the Association?

PROFESSOR SEDGWICK.—I move that the Secretary be empowered to cast a ballot for these gentlemen as members of this Association.

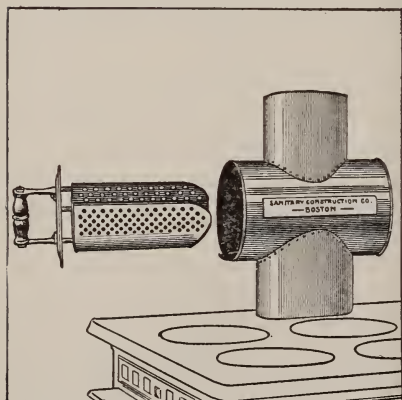
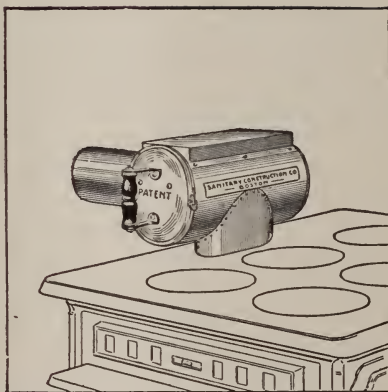
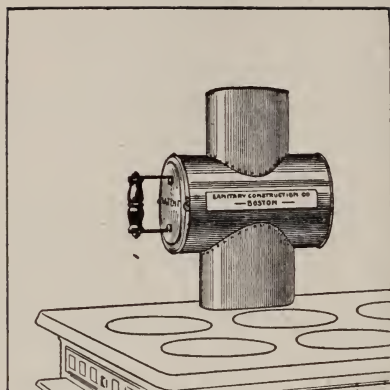
The motion was seconded and carried, and the Secretary cast the ballot accordingly; and the gentlemen were declared elected members.

THE CHAIRMAN.—Is there anything to be offered as incidental business? If not, I will take this time to show you a diagram of a device which has been invented by a Boston party for taking care of household garbage in the kitchen.

Until a very recent date all discussion upon the subject of garbage disposal by sanitary associations and municipal governments has been directed solely upon the selection of some one of the many expensive public methods, none of which can be brought into use until after the garbage has been endured upon the premises for a time as a nuisance, collected at public expense, and has become intolerable. The selected methods have been a dumping at sea with the defilement of the harbor and the beaches, a haul inland for burial or to the public cremator or digester, each of which is attended with large additional public expense and more or less public nuisance. These methods of dealing with garbage cannot be called preventive medicine, but rather curative, with the physician called at a very late stage of the disease. We have here represented a single device which deals with all kitchen wastes successfully, with less care and trouble than with the bucket in the yard, and with no odor or objectionable feature whatever. It is a sheet-iron basket with perforated sides, a capacity of three or four quarts, and is to be inserted into a moderate expansion of the funnel just above the stove. It does not interfere with the draft or any use of the stove, and may be emptied only every morning.

The garbage is dried to a charcoal by the waste heat in the stove pipe, and is used as fuel to kindle the morning fire. This method is clean, convenient, inexpensive, and within the reach of all classes. It is what we may call "preventive medicine" in the truest sense, and is worthy of our best attention. The proprietors of this apparatus are Boston parties; and they have kindly sent this diagram at my request, and also a few blue prints which you can take along with you.

If there are no reports of committees to be offered, I will say one word for the Committee on Legislation. There has been during the past year very little call upon the legislative committee at the State House. In one instance only has a question affecting public health arisen in which the committee has taken an active part, and that was on the attempted interference with our plumbing law. Your committee, consisting of Judge Smith, Mr. Coffey, and myself, went before the Committee on Public Health, and



SYSTEMS OF SEWAGE DISPOSAL IN MASSACHUSETTS.

LAND DISPOSAL.

Framingham.
Marlboro.
Westboro.
Gardner.
Lenox.
Medfield.
Brockton.

Public Institutions.

Worcester Lunatic Hospital.
Danvers Lunatic Hospital.
Westboro Lunatic Hospital.
Medfield Lunatic Hospital.
Concord Reformatory.
Foxboro Asylum.

SUBSOIL FILTRATION.

Sherborn Reformatory. } Abandoned.
Lenox. }

DISPOSAL INTO WATER.

Rivers.

Westfield.
North Adams.
Northampton.
Holyoke.
Springfield.
Southbridge.
Clinton.
Spencer.
Ware.
Taunton.
Amherst.
Lowell.
Lawrence.
Newburyport.
Middleboro.
Bradford.
North Andover.

Into the Sea.

Boston and the North Metropolitan
district,—18 cities and towns.
Winthrop.
Revere.
Lynn.
Gloucester.
Nahant.
Quincy.
Beverly.
Fairhaven.
New Bedford.
Fall River.

Chemical Treatment.

Worcester.
Mystic Sewage at Winchester.

Settling Tanks.

State Almshouse, Amherst.
Taunton Lunatic Hospital.
Northampton Lunatic Hospital.

did what it could to save the law from unfriendly amendments. I was told by Judge Smith this morning that the Senate yesterday rejected the new bill which was intended to destroy the existing law by a vote of sixteen to eleven.

The first paper in order is upon Sewage Filtration and Municipal Sanitation, by F. Herbert Snow, of Brockton.

SEWAGE FILTRATION AND MUNICIPAL SANITATION.

BY F. HERBERT SNOW, C.E.

Mr. President and Gentlemen,—If civilized man is not stronger and healthier in the future than he has been in the past, it will not be the fault of sanitary science.

Sanitation has demonstrated that disease is a penalty, and that the cause of disease can be largely avoided. Diseases which once decimated populations by thousands, now, thanks to sanitary science, reap their harvest of death by hundreds only. The cause and nature of disease and the conditions which will reduce sickness to the minimum are better understood than ever before; and recent scientific discoveries are stimulating research and inquiry which should result in still greater benefits to individuals, communities, and nations.

The knowledge of bacteriology and its relations to disease has opened up a wide field for preventive remedies. There is acknowledged authority for the statement that about twenty-five per cent. of all mortality is caused by preventable diseases. This being true, the death-rate of communities can be reduced, and the average duration of life extended in health and usefulness, and the condition of living vastly improved, if the knowledge of preventive medicine can be put to practical public use. Here is where the difficulty lies. The people even of this enlightened period are not ready to receive this doctrine.

Now, a system of sewerage comprising a proper method of sewage disposal is one of the most important of preventive measures; and yet it is seldom that the people want or will allow such works to be properly designed, constructed, and maintained if they can prevent it. Pride of opinion, petty jealousies, and personal pique interfere to a lamentable degree.

The system of sewage disposal by downward intermittent filtration, which you have inspected to-day, is eminently a sanitary measure; but it has few friends and many enemies, some of whom would be glad to witness its failure at any cost. It was adopted by the City Council as a last resort. Even its designer and builder at first favored another scheme.

The town of Brockton had suddenly grown from a country village to a manufacturing city of thirty thousand population. Conditions of living, which were formerly allowed as healthful, could not longer be permitted without jeopardizing the health of its people. Sewers were demanded; but what should be the method of disposal? Any method which would not hinder, but facilitate, nature's method of disinfection might be adopted.

It was found that, whatever the method of treatment of sewage, its purification, or oxidation, is obtained by one mode; namely, chemical action. Sometimes this purification is attained by disposing of crude sewage into some stream of sufficient volume to thoroughly diffuse and oxidize the impurities; and then, again, only the effluent from a chemical precipitation plant can be safely turned into a stream.

The Sewerage Commissioners began to investigate. The Taunton River watershed was studied, and the equal rights of all towns therein to turn crude sewage into the streams taken into account. The significance of the experience of neighboring cities, and the probable attitude of the city of Taunton, made plain the fact that only clarified sewage could be turned into the river above or below Taunton.

In laboratory work not over two-thirds of the nitrogenous organic matter is removed from the sewage. In practice, only a small part of this organic matter in solution is removed, so that, while the effluent from the chemical plant may not have an objectionable appearance, it is, in reality, the concentration of the impurities of the sewage, which contain the bacteria, or disease-producing germs. It did not require any great stretch of the imagination to conceive of circumstances attending an outbreak of epidemic disease in the city of Taunton, being directly or indirectly attributable to the use of the river as a carrier of infectious germs from such a plant up stream; and it was decided that Brockton could not maintain, with any assurance of permanency, a plant for the chemical treatment of sewage, with the intention of delivering the effluent into the river above Taunton.

Attention was then directed to tide-water disposal into Jones River, North River, and Weymouth Fore River. A place was found at Pier Head, at the entrance to Plymouth Harbor, where crude sewage disposal would not be objectionable. The nearest point at which sewage could be turned into North River, and avoid conditions adverse to complete removal to the ocean, such as flood-tide, shallow water on marshes and flats, head winds, a crooked channel, and eddies in the current, was found off Truant's Island; but even here such disposal would not be practicable without first restoring the river to its original condition of tide and current. The objections to disposal into Weymouth Fore River or a connection with the Boston Main Drainage Works at Squantum were so great as to render the scheme positively impracticable.

The estimated cost of reaching tide-water at Taunton River, Plymouth Harbor, or North River, exceeded a million dollars; and hence it was thought that Brockton and adjoining towns might derive a mutual benefit by joining in a general scheme. When, however, after an original study of the local problems of eleven towns, it was found that, with a reasonable outlay, there were places where sewage could be discharged or disposed of by some treatment without causing a nuisance, and at an expense very considerably less than the cost of a connection with a metropolitan scheme, it became evident that Brockton and vicinity had not reached the size and financial ability to grapple successfully with the problem of disposal into tide-water.

There being no stream or tide-water available, land treatment only remained to be adopted; and it was found that, of all the areas in or out of the city, the old musterfield, or present location of the filter-beds, was the most feasible.

Now, the term "filter-beds" is a misnomer so far as it relates to the manner of purification of sewage. The popular idea is that intermittent filtration is a mechanical straining, and hence the people's opposition to the method. Common sense asserts that it is only a question of time when a filter will become clogged with accumulated strainings. This is all right, so far as it goes; but the public do not know that it is with the purification of the organic compounds in *solution* that we are chiefly concerned, and that the matters in suspension, which can be seen and sometimes smelled, are the least harmful and easiest to get rid of. The suspended matters do gradually fill up the surface pores of a filter, and make necessary the replenishing of the material at certain intervals. If this can be done without offensiveness to the senses of the people, they care nothing whatever about the poisonous germs in solution or what becomes of the liquid filth.

Through the action of the air and bacteria, putrefying matter sooner or later reaches a harmless inorganic form. A filter-bed merely introduces conditions favorable to the aiding and quickening of this action. When sewage is poured upon the surface of a filter-bed, it is carried down by gravity, separated into small particles by the dividing quality of the sand, and brought into intimate contact with a large supply of oxygen. Just as ice chopped up will melt faster than in a cake from the increased surface presented to the heat, so the films of sewage hanging on the grains and stretching between the particles of sand will be more rapidly oxidized and purified. As the lungs are continually inhaling a new supply of oxygen for the purification of the blood, so likewise must a filter-bed, to be efficient and enduring, have a regular respiring action. This is the principal of intermittent filtration. It is a chemical action. The necessity of a supply of oxygen is absolute.

The proper relation of air and sewage varies in different sands. Sewage is liable to pass through coarse sand before the process of purification is complete. Lack of sufficient air forms the chief difficulty in fine sand. For each sand there is a size of dose and interval of time between doses, which will give the best results. To find the economical dose is to attain the economical management of the filtration plant.

The success of filtration of sewage depends wholly upon intelligent management. Speaking generally, the people who pay the bills and the councils who appropriate the money do not readily comprehend the vital importance of this fact. They are liable through ignorance or prejudice or stupidity to handicap a department and prevent the proper maintenance of a sanitary measure.

As a good illustration of the popular opinion of filtration of sewage, allow me to give this instance: A gentleman, a former member of the city government, stopped me on the street the other day, and said, "I think the Board of Aldermen had better go slow in making an appropriation for the extension of sewers." "Why?" I asked. "Because," he replied, "the residents in the vicinity of Marshall's Corner complain that the proximity of the filter-beds is a nuisance and a menace to the health of the neighborhood, and that their property is depreciating in value; and I am of the opinion that they may yet oblige us to abandon the entire disposal plant or purchase their property."

It is strange, but true, that, while people inhale no less harmless odors from a newly fertilized lawn without inconvenience, the mere suggestiveness of the term "filter-bed" carries with it repugnant odors. No amount of reasoning will convince such people that treatment of sewage upon land is the safest and most natural way, and that no possible harm can come from it if it is properly handled.

It is surprising to note the general opposition to not only the filter-beds, but the entire sewerage system. Appropriations for the rapid extension of sewers into residential districts are opposed because owners of individual estates and of tenement houses do not want to sustain the additional expense. Some say that because the cesspool never has to be cleaned out their property is not in need of sewers. Others point to the low death-rate as an argument that too much money should not be spent in extending sewers where they are not called for. The whole question is weighed in the balance of popular sentiment. On one side are put the present low death-rate, and the abundance of porous, sandy soil, and the successful disappearance of house drainage in sandy-bottomed cesspools, and all that can be said to show that sewers are not a necessity; on the other scale, the slight objections to cesspool and privy vaults, the general desirability of sewers, and the employment such works afford to the laborer, and all that

can be said in favor of sewers, are put. And the two may about balance. The money weight is then put on, and down goes the first scale with a bang.

Five years ago there were 3,386 privies and 2,743 cesspools in this city, many of them in close proximity to wells and bedroom windows; and to-day there are many more. These places of indecence hold accumulations of the worst kind of decomposed filth, which inevitably permeates the air of cellars, houses, and yards with poisonous gases, and in sandy or porous localities saturates the soil with liquid pollution, there to remain in an active state of putrefaction, a veritable underground "sea of death." And yet the question, "Is the cesspool a nuisance, and shall it and the privy vault be abolished?" is being argued in this city to-day.

Sanitarians have demonstrated that the definite and remediable cause of particular outbreaks of disease has been the cesspool; and yet the public do not demand and municipal officials do not hasten to remove the cause, without questioning the advisability of the expense. If they accept in a broad way the fact that certain engineering works always diminish the amount of sickness and death, attempts to demonstrate to them the necessary connection in any particular case between sickness and the cesspool usually prove a failure.

Erroneous notions of sanitary laws are held because their observance would require a few dollars' expenditure. Frightful visions of the poor-house are conjured up before its opponents, producing a spasmodic contraction of the pocket-book, and driving them further from the divine doctrine of sanitation.

These oppositionists do not want to be told that sanitary reforms are of vital importance to public health. They oppose the abolition of cesspools, privy vaults, and domestic wells, and the introduction of sewerage and underground drainage and public water supply; and they object to public inspection of house plumbing or anything else which pertains to their own welfare. They oppose any movement which would interfere with their unsanitary notions of individual freedom or increase the municipal taxation of private property. They are indifferent or blind to everything but their own selfish interests. They will see nothing but objections to any movement which is broad and liberal and caters largely to the masses. Some are more than willing, they are anxious, perhaps, to enjoy the advantages of sanitary measures, and they are abundantly able to bear the expense; but they strenuously object if they imagine they are to be called upon to pay for more than they can personally enjoy.

They say that in those districts where death-rates are greatest the ignorant, idle, and vicious, the intemperate and incapacitated, will be found, whose unsanitary habitations are adapted to their tastes and customs, and

out of whose inherited ancestral degeneration and starved brain condition they will not be elevated. Money expended in such communities for sanitary purposes they claim is worse than wasted. But they forget that among this kind there is a distinct class of honest poor people, who industriously struggle for themselves and their children, in the hope that fate may not always be against them, and who appreciate assistance and are truly worthy of it, and that the more fortunate classes cannot be assured of immunity from disease which emanates from such unhealthful localities.

It is because teeming masses of humanity find in the close areas and life of cities and towns little to encourage the observance, but much to promote a disregard of the laws of their physical well-being, that sickness, like an evil spirit, pervades the atmosphere, and hospitals, asylums, and almshouses are populated with objects of public and private charity.

By all the laws of society and civil government, every town and municipal corporation is morally and physically bound to furnish to its population pure water, the purest air possible, and a well-drained soil. Later on, when people more universally know the truth, any other than sanitary conditions may be considered as criminal negligence, and good and sufficient cause for claims for damages, just as now suits are brought to recover damages sustained by individuals who, through faulty conditions of the highway, have been injured in person or property.

One of the important questions of the hour is, What shall be the relation of sanitation to city government? Politics, the bane of sanitary progress, will not permit a comprehensive consideration of the subject. Increased taxation for sanitary measures affords a most favorable opportunity for the party out of power to charge the party in power with reckless extravagance and public robbery. Permanent sanitary works, designed and constructed for future requirements, are always costly, and hence the temporary and wicked policy pursued in most American cities, to the sacrifice of human life and to the shame of our boasted civilization. Ignorance, selfishness, and avarice prevail at the expense of the health and liberty of the people. Because air and water are free, individuals are allowed to pollute and contaminate them at will, so that the glorious rights of the American citizen be not imposed upon. Such liberty is death. It is not the freedom which our forefathers heroically labored to establish, not the government of the people, for the people, and by the people, which true democracy demands.

Without proper sewerage, drainage, street cleaning, garbage and refuse disposal, and an abundant supply of pure water, no amount of individual hygiene can garrison a city against an invasion of epidemic.

A sewerage system cannot prevent sickness, even when it is so designed and maintained, and sufficient authority over the house connection and plumbing is had to afford the people a reasonable assurance against con-

tagion or the influence of preventable diseases, so far as they may be attributable to sewerage. But, if systematic supervision over the flushing and ventilation of sewers is not constantly had, they inevitably become foul, elongated cesspools, and breathe noxious gases through faulty plumbing to the inmates of buildings.

Doctors have found this to be almost an invariable cause of certain kinds of fever, and nine-tenths of the cases of diphtheria reported in certain places have been attributed to sewer gas. Thousands of the brightest and best of the race had to perish, victims of sewer gas, before it became apparent to certain authorities that municipalities must have positive control of a sewerage system from the top of the house to the end of the sewer.

Intelligent oversight that understands the design of a system of sewerage and of sewage disposal, and fully comprehends the difficulties of its sanitary maintenance, is absolutely necessary to prevent conditions favorable to the rise of zymotic diseases; and yet the health official, who enforces uniformity in sanitary observations, is sure to arouse and draw down upon himself the personal enmity of a class who think themselves better informed of sanitary requirements, and who not only speak in pronounced terms against systematic sanitary reform, but bitterly oppose the continuance in office of its advocates and supporters. This class believe that it is a safe measure to renovate their neighbors' premises, but the least intimation that their own property should come under sanitary supervision is received as a slanderous insult which their pride never forgives.

Politics ought not to enter into such offices. Possibly there are men, progressive, broad-minded, and whole-souled, that can interest, convince, and enthuse certain fault-finders and doubting Thomases, and laugh at the difficult obstructions others may place in the way of reform, who thereby have qualities which fit them for positions of public importance, and who, for honor or love, would be willing to fearlessly discharge the duties of a health official in accordance with the best sanitary knowledge of the day, even at the sacrifice of their professional, social, or business prospects, and their serenity of mind and faith in mankind. and all this in order to secure the observance of sanitary rules and regulations for the *brief* term of their service. But their name is not legion, and their numbers will not be increased until there is a positive assurance that the good work which must cost so much personal effort and sacrifice will be continued beyond their connection with the reform.

To these difficulties may be attributed the slow progress of certain sanitary reforms; and I say that the cause is almost hopeless so long as officials must, unprotected by tenure of office, cope with political and social powers.

Legislation is being continually directed toward the prevention of

disease and death. Able minds have urged and secured the passage of sanitary laws which have accomplished much good, and yet the value of law is in its enforcement. The people keep on in the same customary way of thinking and living and acting, committing sanitary indiscretions which largely escape public notice, and which effectually prevent them from discriminating between the truth and error. To their habits and customs of thought they will cling with the utmost tenacity, until driven to forsake them. Getting everybody educated up to public hygiene is all well enough; but compulsory hygiene will accomplish the desired results. People cannot be forced to believe, but they can be forced to obey until they believe. When the prevalence of disease threatens life and health, certain habits are given up, and health rules are carefully observed. When the danger is past, the people are as careless as ever. A popular presentation of the subject may momentarily appeal to the common sense of every intelligent person, but it is soon forgotten. There are natural causes for this lack of interest in the subject. Each individual takes care of himself, and avoids those who would contaminate him. He is too busy to look out for others. Human selfishness is the ruling motive; and so long as this is true, and people aggregate in communities, the prolongation of life in preserved health will be a public duty.

The contemplation of the possibilities of sanitation for the masses when people comprehend the truth and are converted from the error of their ways is very pleasant. It is very pleasant to think that a universal recognition and faith in the laws of sanitation would diminish the cause and hence the occurrence of disease; but how many you can find in any community who realize the value of the observance of such laws only when they are made to through fear and trembling,—during the fearful ravages of some dreadful epidemic! The people may be momentarily elevated to catch a glimpse of the brightness of the coming sanitary era, but it seems to be only a vision of the other world, where sickness and sorrow, pain and death, cannot enter; and so they fall back into the old way of living.

Such people need to be led. They need to be governed by laws which they are forced to observe until they see for themselves and willingly heed the will of nature.

Because the public are sceptical concerning almost any proposed remedy for disease, and popular ignorance and indifference have an inertia which can be overcome only by the most constant and persistent efforts, is our responsibility in the least diminished? Is it not rather increased? With the means at hand for the study and observation of such questions, it becomes our duty to take the initiative steps. The intelligent public expect those who are acting in an official capacity, to keep thoroughly informed.

They expect that proper authorities will enact proper laws and city ordinances and health regulations for the protection of their homes and their children from the ravages of contagious diseases. They do not know so much about preventing disease. If they did, legislators would not allow that dread but silent and secret disease, consumption, which is the cause of fully fifteen per cent. of all the deaths in this country, and from whose visitations no climates have positive exemption, to constantly slay its victims, unmolested by active legislative measures of repression and prevention, while the more local, sudden, and intense, but less deadly cholera, fevers, and small-pox, are combated by rigid municipal, State, and national quarantine regulations. If the people realized as we realize that the atmosphere is a great medium for the transmission of disease, that suspended particles of refuse dust, animal matter, bacteria, and micro-organisms, and gaseous and vaporous impurities are constantly present to a greater or less extent, and that the accumulation of these foreign substances in the atmosphere is a detriment to the health of mankind, then persons whose systems have been weakened and perceptions blunted by habitual breathing of vitiated air, when told that their symptoms, characteristic of specific maladies, are caused by atmospheric impurity, would not be so slow to believe and to change their condition. There are thousands of this class to-day who cannot change their surroundings or vocation, and their consequent proneness to disease is, I claim, in a measure chargeable to the government; and an officer, local or general, in the possession of the knowledge that the prevalence of a low state of vitality is due to remedial causes, who does not take active measures to prevent the violation of nature's laws, must expect from Almighty God the just recompense of his reward.

I sincerely believe this, but I would offer an apology for past officials. It is said that "the time of their ignorance God winked at, but now he calleth all men to repentance." Man's thoughts and actions are quite liable to be like the thoughts and actions of the world around him: and hence it is not strange, since the characteristic American man solves all problems on the basis of the dollar, that the health official is inclined to carry no greater weight of responsibility than the economical enforcement of existing laws. The primary object of the law is too many times overlooked, and profit and convenience allowed to control. It does not do for Boards of Health to drive the square-wheeled sanitary cart too fast,—they can't stand the bumps.

Now, while much may be accomplished by legal processes and while law and its rigid enforcement is of first importance, yet sanitary interests are not the only interests of a community, and, until popular education removes popular prejudice, the enforcement of sanitary regulations beyond the extent to which it is carried to-day will be considered as an interference with

personal liberty. A high standard of public health cannot be maintained until the sympathies of the people are enlisted. They must be first taught the importance of personal hygiene, and then they can see clearly the importance of public hygiene.

The cause of education would be aided and abetted if certain influential persons always to be found in any community, who believe that preventive remedies on a large scale cannot be practically applied, could be shown the value of human life. Such men stigmatize health measures as unnecessary obligations and burdensome extravagances, and their talk prevails upon conservative members of legislative bodies to vote down or cut appropriations. Their belief that indolent and low-born people are not worth saving, and that their fate is pestilence, famine, and war, belongs to the age of tyranny and superstition. It belongs to the depraved and the assassin, the cannibal and the barbarian, who place but little value on human life, and not to prudent and industrious parents and to intellectual and ambitious people.

Yes, human life is worth living and saving; and its value will increase with the advancement of civilization. Sanitary progress may be slow and its course tortuous, depending upon who is at the helm; but it is as sure as sure can be.

Then let public interest and thought be aroused and directed in proper channels. Let the people be shown that youth, inexperience, and indiscretion are the faults of our country. Let them be shown that experience has taught foreign countries the necessity for their preservation of the enactment and enforcement of rigid sanitary laws, and that in this respect the best conducted cities in free America suffer in comparison with some of the European monarchical governments.

Let them be told that France has one doctor to every 3,000 inhabitants, Germany one to every 1,500, and the United States has one to every 600 inhabitants; that France graduates 600 medical students every year, Germany 900, and the United States graduates nearly 4,000 students every year.

Let them be asked, since one ounce of prevention is worth sixteen ounces of cure, why 6,666 doctors, laboring to prevent disease, would not accomplish as much as the 100,000 doctors who are trying in this country to cure disease. Would it not be vastly better for the government to constantly employ the remaining 93,334 doctors in reducing and preventing sickness and death, and thereby removing many heavy burdens from the people, rather than to pay out the enormous sums which are now expended for the support of almshouses, hospitals, asylums, jails, and prisons? Would it not be an example of practical economy?

Tell them that an abundant supply of pure air to shops and buildings

during working hours would accomplish much toward diminishing disease, that sanitation demands the proper ventilation of all buildings, and, to accomplish this, perfect sewerage and drainage are absolutely necessary.

Tell them that eight hours should constitute a day's labor, since man's body is a machine whose parts were intended to wear out together. But wearisome and unequal hours of labor and the privations of poverty cause some parts to break down while other parts are strong; and the man sickens and dies, or draws out a long existence of pain and wretchedness. So sanitation would aid labor, and laborers would do well to render hearty support to sanitary science.

Tell them that eight hours only of labor is more a necessity for shop hands, clerks, and most all indoor and sedentary occupations than for out-of-door work. Take, for instance, the brain worker, who has added to mental labor great responsibility and its weight of anxiety. This extra load has to be borne by the heart, which already has its full quota of work to perform; and, if the extra strain upon the system is borne incessantly for long hours, it will oppress the heart, weary the muscles, irritate the nerves, and, if shorter hours of labor are not observed, will possibly result in sudden death.

And, when the people have been enlightened, then will they accept with eagerness the gospel of sanitation and hygiene, and cheerfully obey the laws of life as revealed in nature. But before this day comes many must be taught by sad experiences to desire truth and rightness of living, and many who would change their surroundings must be kept from the full enjoyment of sanitary blessings by the scepticism, habits, and slothfulness of the masses.

So, then, proper and sanitary laws are of the first and greatest importance; and, in order that they should be the best and most effective that can be devised, they should emanate from the State. Sanitary laws should be State laws, and sanitary officials State officials, thus avoiding certain evils of municipal administration, and the securing of competent officers. The State Board of Health should have a grand advisory and supervising power, the local Boards of Health be filled with men especially adapted and fitted and interested in the work of sanitation, and the maintenance of certain public works should be brought more directly under their control.

Legislation should be had upon all those subjects which affect public health. Sanitation urges the enactment of laws relating to the ventilation of dwellings, workshops, buildings, drains, sewers, yards, streets, etc.; of laws relating to the width of streets, air space between buildings, topographical regulations for physical growth of towns and cities, and open spaces and public parks for the constant renewal of pure air. Laws should be passed for the regulation and protection of people wherever they may

congregate. Sewerage and drainage systems should be compulsory. General immigration should be taken in hand. Incentives to active sanitary endeavor, in the way of liberal compensation for services, should be offered. Executive officers should be well qualified, and free from political usurpation. Architects and builders should be required to submit specifications to the proper authorities. The liberal use of public water should be compulsory. Abatement of rentals could be made, if necessary, so that no person would be impoverished by the abundant use of that which is essential to cleanliness and even to life itself. Public baths should be established, and compulsory washing be enforced, until a love for so healthful an exercise became prevalent.

And now, in closing, allow me to express my appreciation of the honor of addressing so distinguished a body of gentlemen, the importance of whose mission should be secondary to none, and upon whose watchfulness and fidelity, judgment and integrity, as guardians of the public health, depend the temporal comfort and happiness, and to a certain degree the moral and intellectual destiny, of the masses.

In your battle against public stupidity and scepticism may you receive the support of universities and institutions of learning! Through your efforts may statesmen become as much concerned in the preservation of public health as in the extermination of bugs and insects! May the people become as much alive to what affects their health as to what affects their pocket-books! May men be as anxious about their own and their neighbors' health as they are to prevent disease among hogs, cattle, and horses! And may you live to see facts which are now ignored become gladly accepted, plans which are now frustrated by lack of public enlightenment carried out by general and cordial co-operation of communities, and the day when the execution of sanitary improvements will be hailed with joy, and its importance universally recognized!

THE CHAIRMAN.—In the absence of Dr. Walcott we shall have to pass the next paper ("List of the Various Systems of Sewerage in Massachusetts," by H. P. Walcott, M.D.).* Inasmuch as the following paper is upon a subject of the same nature as that we have already had, we will postpone discussion until it has been presented:—

*Dr. Walcott has prepared a list giving this information, which will be found on page 33.

PURIFICATION OF SEWAGE-POLLUTED WATERS BY
SAND FILTRATION.

BY PROFESSOR W. T. SEDGWICK.

Mr. President and Gentlemen,—I had hoped that the discussion of the interesting paper which has been presented by Mr. Snow would have lasted so long that we should have been obliged to take the train before the time came for me to say anything; but the Chairman has called upon me, and I shall have to do the best I can.

I had hoped that Engineer Snow would give us something more than he has done upon the construction and operation of the plant which he has so admirably carried out, and which we have so much enjoyed visiting to-day. Personally, I am much impressed by it; and it seems to me that the city of Brockton has done an excellent thing in that it has set about the collection and purification of its sewage in the careful, thoughtful, and scientific manner that it has. As any one can see, most of the work is still to come, the actual work of filtering; and in the hands of its skilful and enthusiastic engineer I feel sure it will go on well, especially as it is under the control of an efficient Board of Sewerage Commissioners.

With regard to the Purification of Sewage-polluted Waters I will say only a word or two. The matter may be stated rather briefly, something like this: Why do we attempt to purify sewage-polluted water? For two reasons: first, because such water is a nuisance; and, second, because it is apt to be dangerous to the public health. It certainly is dangerous to drink.

How shall we go to work to purify it? Well, how does nature go to work? If the farmer puts upon his field barn-yard manure year after year, giving it a heavy dressing of the material, this is easily taken care of by the mother earth. No one knows or thinks that the farmer is creating a nuisance, the odor is not objected to by any one. On the contrary, every one of us feels a sort of primitive agricultural delight in the smell of good barn-yard manure thus utilized, and we have no objection to living in the neighborhood. I have seen the lawns on Commonwealth Avenue in Boston so covered with stable manure that one had almost to hold his nose in passing, and yet the same people who do not object to that odor would complain most bitterly of the slightest odor coming from a garbage pail or anything else of equally unsavory nature or origin. We know that the earth takes care of this organic matter. And the same is true of the conditions of the ordinary untidy country house or the tenement house, where

the housewife, to get rid of her dish-water or slops, throws them out of the window. Unless that is done in excess or for too long a time and under unfavorable circumstances, the earth takes care of all the stuff thus thrown out, and little or no trouble ensues. Here is a hint for the doing of the whole thing. The earth is capable of taking care of the organic matter, provided it does not have too much of it or have it for too long a time without change.

We have arrived at this conclusion by experimentation. As long ago as 1839 London began to filter the highly polluted water of the river Thames through sand filters. It was supposed that by simply straining out the suspended matters and some of the dissolved matters the water would do no harm. Bacteria had then not been heard of. But time has gone on, and it has been found by making a study of the affair that, by putting sewage-polluted water on the land, with the right kind of soil, you can dispose of sewage on land as the farmer disposes of his barn-yard manure; or, on the other hand, in the case of sewage-polluted water, that a larger volume of water can be treated, and then recovered through an under-drain, and used for drinking.

As an example of the first case, the city of Berlin, a city of a million and six or seven hundred thousand population, disposes of its sewage upon the land. The river Spree runs through the city, but does not receive the sewage except in times of storms, when the overflow goes into the river. The sewage ordinarily is disposed of upon the land; and the same principle is applied as here in Brockton,—namely, the putting of a thin layer of sewage upon the soil, and letting the earth take care of it. In the case of Berlin they make use of the sewer-impregnated soil to raise crops; but, when you commence to raise crops at the place where the filtering is going on, you must remember that you cease to operate the filter to its highest capacity. In Berlin they raise cabbages and other vegetables, where the sewage of sixteen or seventeen hundred thousand people is disposed of on the land; and the effluent water, as it comes out below, is used for drinking. Here is an instance of the disposition of sewage in this way on a large scale. And if any one says that Brockton's plan is only an experiment, and that no one can say how long it is going to continue satisfactory, or how it will be in fifteen or twenty years from now, we may reply that Berlin has been doing the same thing for years, and there is no uncertainty about it; that the mother earth, when the place is rightly chosen and the operation is properly managed, will take care of any amount of organic matter which you may wish to put upon it.

When you come to water purification, there is the same problem with certain modifications. Sewage is water gone bad, water with excess of foul matters,—such as we saw to-day,—which sewage was not ordinary sew-

age, but thinner, yet for my purpose answers well enough, because I may point to those filter-beds, and show you sewage-polluted water purified there by sand filtration. It was sewage, so called. It was really sewage-polluted water: and that is what sewage always is. The sewage of Berlin is so polluted that it becomes almost as black as ink, and is as thick as thin mud. I have seen it of that character on the filter fields of Berlin, like thin black mud or thick ink. Now in such a case, ordinarily, there is one unfavorable condition: the sewage does not contain any oxygen. These filters are not strainers, they are not mere heaps of sand; but, when in good working order, they are rather like living organisms, for they are filled with bacteria which breathe and feed, taking up the organic matters of the sewage. Oxygen being available, the bacteria resident in the sand feed upon the organic matters, and reduce them to simpler matters of a mineral sort, and their organic character is lost. It is as if those filter-beds were a gigantic living sponge. You know the sponge before it is gathered is a living mass permeated by narrow channels. And, if we imagine one of those filters to be a heap of sand, swarming with living bacteria, we can see how easy it is for the sewage-polluted water to flow into this great sponge, and for the living contents of the latter to feed upon the matters it contains. When the filters are water filters, they work more freely, because ordinary water is saturated with oxygen.

The theory becomes comparatively simple when looking at these filters, if one does not regard them as mere sand, but rather as something which would remind us of London and Paris with their dense populations, great centres teeming with multitudes of individuals. The sewage that arrives they receive with open arms, taking from it the organic matters which are their food, and working them over into mineral matters, which, in solution, pass off below. So the purification of sewage-polluted water is pretty much the same thing as the purification of sewage, only the work is done faster because of the oxygen in the water. You have an example of this in the city of Lawrence, where you have heard of the municipal filter designed by Mr. H. F. Mills, of the State Board of Health. That city is now supplied with water fit for drinking, purified by simple sand filtration in a bed two and a half acres in extent. It is not merely a bed of sand, but contains a vast multitude of bacteria, feeding there upon this impure water, which, after it is filtered, goes into a reservoir pure and clear. We may see how the thing works as far as can be seen with the naked eye, but for scientific purposes we must take a microscope; and we shall then find every grain of sand in this great filter coated with bacterial jelly, and bacteria actively at work doing their part in the process. If we wish to see what has been accomplished in this way, we can compare the death-rate in Lawrence as it is now with the death-rate which prevailed before the filter went into opera-

tion. Lawrence, instead of standing higher than any other city in the Commonwealth in deaths from typhoid fever, as it did, stands now on a par with those cities which are furnished with a good water supply and having similar industries and climate; and its bad reputation as a breeder of typhoid fever has disappeared. Typhoid fever is no longer "endemic" in Lawrence: it is only occasional and sporadic, as it is in Haverhill, Brockton, Lynn, and all other cities with good water supplies. There are a few cases arising from the use of water taken unfiltered from the river, and a few imported cases, and also cases from using bad milk and from other sources; but the death-rate of Lawrence from typhoid fever now compares favorably with that of other cities of its own size, character, and situation having perfect water supplies. In other words, sewage-polluted water that is purified is not objectionable, but safe. The same thing is true of London, which for many years has been supplied with sewage-polluted water thus purified. The death-rate of London from typhoid fever is very low.

In looking at these so-called intermittent filters, then, one should take out of his mind any idea that they are mere heaps of sand. Every grain of that sand has on it thousands of bacteria which have taken up their residence there in a jelly-like form, so that the total effect is softness of the soil, because of this great aggregate of bacterial life. It is bacterial life which takes care of the farmer's manure spread upon the earth, and of the dish-water thrown out of the window by the careless housewife, and of the sewage which is spread on fields, as you have seen it to-day.

THE CHAIRMAN.—We have still another kind of sewage purification in use in this State. Perhaps Professor Kinnicutt, of Worcester, can tell us something of the success of the chemical purification of sewage water at that place.

PROFESSOR L. P. KINNICUTT.—I feel a little out of place in speaking to you at this time on chemical precipitation. To-day we have had the pleasure of seeing a plant for treatment of sewage by intermittent filtration, a plant which has been laid out with great skill and which gives every indication of doing perfect work. As your Chairman has said, however, there is another system of sewage purification used in this State, that of chemical precipitation, which consists of adding certain chemicals to the sewage, causing the precipitation or settling out of all the offensive substances that are suspended in the sewage, and a part of the offensive matters that are in solution.

By this process we do not attempt to change sewage into drinking water,

but to obtain a perfectly clear liquid, which has no disagreeable odor, and is not in any way dangerous to health unless it is used as a drinking supply, and which can be emptied into a running stream without causing any offence.

In Worcester we purify the sewage by this process.

The population of Worcester is about one hundred thousand; and, the sewers being for the most part constructed so as to carry off both the street washings and the sewage proper, the amount of sewage treated each day is twelve million gallons.

In deciding on the best method for the treatment of the sewage, a careful study as to the character of the sewage was made; for, though the process you have seen to-day may work perfectly with certain kinds of sewage, it is very doubtful what would be its action on all kinds of sewage.

It was found that Worcester sewage contained large amounts of free sulphuric acid and of various iron salts; and it was decided that successful purification could be better achieved by chemical precipitation than by intermittent filtration, or, in other words, good results could not be expected by putting such sewage directly upon land.

Chemical precipitation as the means of purification being therefore decided upon, a plant was constructed for this purpose about three-fourths of a mile from Quinsigamond Village, or about three miles from the centre of the city.

The plant consists of an outfall sewer, a mixing house for the chemicals, engine and dynamo house, a chemical laboratory, and sixteen settling basins, the whole costing about two hundred and fifty thousand dollars.

The process used is adding milk of lime and sulphate of iron to the crude sewage. The sewage contains a very large amount of iron sulphate; but, unfortunately, the iron sulphate does not come to the works at all times, and, when it does come, it is largely in excess of the amount necessary to accomplish the work. So at these periods, which are as a rule three times in the twenty-four hours, part of the sewage is stored so as to be used when there is no iron sulphate in the sewage.

The lime is bought in the form of quick lime, and is slaked and mixed with water, in the mixing house, and discharged into the sewage through a pipe about 800 feet above the tanks, so that when the sewage comes to the tanks it is thoroughly mixed with the lime, the amount of lime used being 950 lbs. of quick lime for every million gallons of sewage.

The tanks are sixteen in number, covering 106,656 square feet and having a cubical capacity of about five million gallons.

The sewage as it enters the tanks is very dark-colored and opaque. As it passes from tank to tank, it grows less and less colored, and clearer and clearer, till, when it reaches the last tank, it is as clear and colorless as spring

water, and only has a very slight odor, resembling slaked lime. From the last tank it is carried into the Blackstone River. The sewage as it comes to the works contains 60 parts of solid matter in 100,000 parts of the sewage, 36 parts of which are mineral and 24 parts vegetable and animal matter liable to decomposition.

About one-half of this vegetable and animal matter is suspended, not dissolved in the sewage. The amount of albuminoid ammonia in the sewage is five-tenths of a part in 100,000.

By the process as used in Worcester, practically all of the suspended vegetable and animal matter is removed, and twelve per cent. of the decomposable matters that are in solution. The amount of albuminoid ammonia in the effluent as it leaves the last tank is, on the average, a little less than twenty-five hundredths of a part in 100,000.

When we were honored by a visit from the Association four years ago, the process was in an experimental stage. To-day, if you would honor us with another visit, we could show you what we consider a successful way of treating the sewage of large manufacturing cities.

THE CHAIRMAN.—The papers and remarks are now before you for discussion, and I presume the reader of the first paper and those who have explained these systems will be glad to answer any questions which you may feel like asking.

DR. CHARLES H. COGSWELL.—What is the final disposition of the effluent which comes from the filtering bed in Brockton?

MR. SNOW.—It empties into the Coweaset River, which is a tributary of the Taunton River.

DR. COGSWELL.—What is the flow of the Taunton River?

MR. SNOW.—It has a watershed of about four hundred square miles, which delivers below the city of Taunton in an ordinary summer a flow of about one hundred and twenty cubic feet per second. This flow would sufficiently dilute the sewage from a population of from forty to fifty thousand. The city of Brockton is at the head of the river basin, and over twenty miles up stream north of the city of Taunton, so that, while the volume of water flowing in the streams in wet weather may be quite considerable, yet during the dry months of the year it is practically nothing for purposes of receiving sewage, either crude or clarified.

PROFESSOR SEDGWICK.—How long before the whole of the present disposal plant will be in use?

MR. SNOW.—We have guaranteed to take care of the sewage of twelve thousand people only on the twenty-two beds now prepared. It is probable

that the capacity of the filters will exceed this quantity. At present there are only eighty-five estates connected with the sewers.

PROFESSOR SEDGWICK.—How soon will you be likely to get the quantity of sewage you would like to treat?

MR. SNOW.—I am unable to answer that question. It depends on the rapidity of sewer extensions, and whether or not owners are required to connect their estates with the system. The present indications are that it will be some time before twelve thousand people have their homes or places of business equipped with the facilities for using the sewers. The Sewerage Commissioners recently recommended an appropriation of \$250,000 to be expended in extending street sewers this year; but, on account of opposition to the extension of sewers into certain districts, the Board of Aldermen cut the figure down to \$175,000. Some of the reasons for the opposition and this action have been previously given in my paper.

DR. F. J. RIPLEY.—Perhaps it will be interesting to the Brockton Board if the gentlemen of other boards would tell us what plan they have adopted in regard to compelling people to make connection with sewers.

HON. E. IRVING SMITH.—Waltham has had more or less experience in that matter. A system of sewers was put in there three years ago, and I think that I may venture a partial reply to the question asked. In 1890 an act was passed by the legislature which authorized boards of health to compel all persons to connect their premises with the public sewer. The practical method adopted by the Board of Health in Waltham was, the first year that the sewer was opened, to send out notices to the abutters, especially in places where the premises were in bad condition, requesting them to appear before the Board, and show any cause they might have why they should not proceed to connect their premises with the sewer. A great many did so appear, and a considerable number showed why they should not be compelled to connect. The reasons commonly given were financial inability or contemplated changes in plumbing which the owners were not yet quite ready to make. A large number of persons were compelled to enter the first year. Besides those who were thus compelled to enter were those who, without appearing before the Board, made voluntary connections with the sewer. The next year—that is, the year of 1894—was one of financial depression; but still we compelled a good many to enter. We did not adopt the same proceeding that we did the first year; but we sent out peremptory orders in the first instance. In making such orders, we picked out certain streets. We found it was not well to have the work done here and there all over the city, and so we took one street throughout as far as possible on one side at a time. We also endeavored to select those streets where improvements were contemplated in the public highways; and to that end we consulted

with the street department, and found out what streets were intended to be repaired or rebuilt or regraded. That was done for the purpose of causing as little inconvenience to the public as possible, and to prevent unnecessary tearing up of the streets.

Of course there were cases when, after a peremptory order, persons appeared and showed good reasons why they individually should not be obliged to conform to the order. We listened to those reasons; and, if they were satisfactory, the parties were excused for the time being, or their cases were continued until some future time, until, for instance, they should complete such changes in plumbing or make such alterations in their buildings as they might contemplate.

The season this year is hardly open; but we intend during the coming year—which we hope will not be one of such financial depression as the last—to compel everybody to connect his premises with the sewer who has not done so before. Already about two-thirds of the houses upon the line of the sewer are connected with it. The remaining third will be the hardest with which to compel connection. We shall encounter in that third all the kickers,—those who oppose the authority of the Board, and those who blaspheme against those sanitary regulations which have been so eloquently advocated this afternoon. Still, we hope to accomplish much; and I think our progress so far has not been too slow, under the difficulties we have had to meet. In Waltham we have put in about thirty-five miles of sewers; and it means a great deal to secure the connection with them of all the householders along that thirty-five miles. Nevertheless, in the progress of our work we have not had one case which we have been obliged to bring into court. The orders thus far have been complied with without serious opposition. Whether we shall be as free from opposition in the future as in the past we cannot tell; but I think we shall probably proceed to a successful termination of our labors.

DR. JESSE ROBBINS.—I should like to ask if there is any authority from the State to compel people to enter sewers, as regards Waltham?

MR. SMITH.—Not specifically as regards Waltham, but there is a general law which applies to all places where there is a public sewer.

DR. ROBBINS.—We found in Salem, when altering our ordinances, that it required an act of the legislature to compel any one to enter the sewer when there was a sewer passing through the street. The greatest difficulty we find there is that a great many people will petition the city government to lay a sewer; and, when it has been laid, they do not care to connect their sinks and cesspools with it.

MR. E. H. BROWER.—I think the Act of 1890, Section 1, requires that every building situated on any street or highway or lane through which there is a public sewer shall, when required by the Board of Health, be

connected therewith by a good and sufficient drain; and Section 2 imposes a penalty of \$200 for neglecting to do so.

MR. WILLIAM H. GOVE.—Dr. Robbins is a little mistaken in his statement. There was a proposition in Salem, when we revised our ordinances, to put in a provision to require connection with the sewer in all cases; but it was not allowed to stand on the ground that this matter was within the jurisdiction of the Board of Health, not of the City Council. There is one difficulty we have to meet; and that is, while we can compel connection with the sewer, we cannot, where there is an old privy and it is not a nuisance, compel the privy to be connected. But the act referred to has been incorporated into our ordinances; and we have referred to it and acted upon it repeatedly, as I am sure the doctor will remember, if he considers a moment.

THE CHAIRMAN.—That is one of the defects which was permitted in the law which was made general in 1890. About ten years ago we obtained special legislation in Boston, in which we got permission to make persons enter the sewer where their premises abutted upon it, and under such circumstances they should not have a privy vault or cesspool, and that is a very important part of the act; but in many instances, as has been alluded to, you may make a party connect with the sewer, and he will connect something with the sewer, and leave his old vault or cesspool just as bad as before. And it seems to me that the law which was made general through the intervention of North Adams in 1890 should be amended again, so that we may get rid of those old vaults and cesspools. We made the first use of that law to get rid of these vaults in Boston, and succeeded in abolishing about eight thousand in that number of years. I think that is a very important defect in the law, and that it should be remedied.

DR. ROBBINS.—I stand corrected by my colleague. In Salem, the fact is, we are having a little row with a man whose vault is under another man's chamber window, and that man is connected with the sewer, and the offender says that we shall have to go to the legislature to compel him to connect. We had a physician in our city who said he was willing to risk his standing and reputation as a physician that a privy near a lying-in hospital was no nuisance. The Board thought differently. While the gentleman who maintained the nuisance was an intimate friend of mine, the Board compelled him to enter the sewer.

DR. RIPLEY.—I should like to ask Judge Smith if, in compelling people to make connections with the sewer, they compel them also to abolish their vaults and cesspools.

MR. SMITH.—We do not directly. Of course, in many instances where we have compelled the connection to be made, it has resulted in the abolition of cesspools and vaults. But we have felt the same defect in the

law and the same want of authority which has been pointed out by the Chairman, and we have only been able directly to abolish privy vaults and cesspools in those cases where they were nuisances. We have gone as far as we can go in that way, and we have accomplished a good deal. Still, we feel that additional legislation will be very desirable to compel a thorough change in the premises at the time connection is made with the sewer, wherever it may be necessary.

DR. ROBBINS.—I think the legislature should pass an act compelling every one to connect his privy vault and cesspool with the sewer.

MR. SMITH.—I should like to ask whether the city of Brockton lays any part of the particular drain to a man's premises.

DR. RIPLEY.—The city puts the drain to the inside of the wall of the house, at the expense of the owner.

PROFESSOR SEDGWICK.—I move that the thanks of this Association be extended to the Board of Health of the city of Brockton, to the Mayor, the Sewerage Commissioners, and the City Engineer, who so kindly extended the invitation to this body to visit them, who have entertained us so pleasantly while here, and who have afforded us the valuable opportunity of visiting their sewerage works and filters.

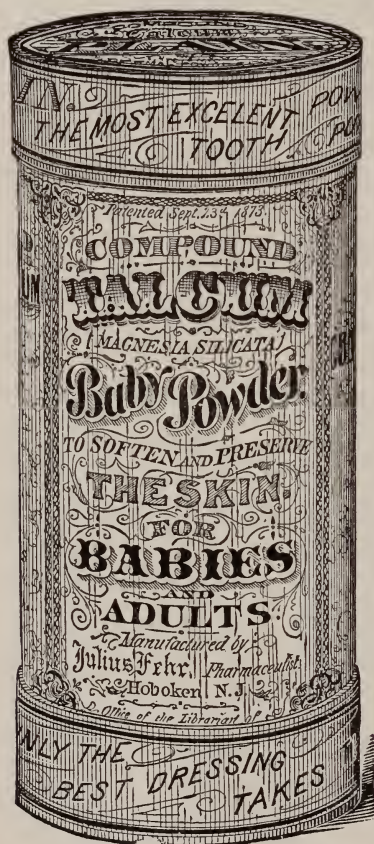
The motion was seconded and adopted.

The meeting was then adjourned.

DR. JULIUS FEHR'S

"COMPOUND TALCUM"

"BABY POWDER."



THE

"Hygienic Dermal Powder"

FOR

INFANTS AND ADULTS.

Originally investigated and its therapeutic properties discovered in the year 1868 by Dr. Fehr, and

Introduced to the Medical and Pharmaceutical profession by Dr. Fehr, in the year 1873.

COMPOSITION.

Silicate of Magnesia with Carbolic and Salicylic Acids.

PROPERTIES.

Antiseptic, Antizymotic, and Disinfectant.

USEFUL AS A GENERAL SPRINKLING POWDER,

With positive Hygienic, Prophylactic, and Therapeutic Properties.

GOOD IN ALL AFFECTIONS OF THE SKIN.

Sold by the Drug Trade Generally.

Per Box, Plain	\$0.25
Per Dozen	1.75
Per Box, Perfumed50
Per Dozen	3.50

THE MANUFACTURER,

JULIUS FEHR, M.D.,

Ancient Pharmacist,

Hoboken, N.J.,

Only advertised in Medical and Pharmaceutical prints.

JOURNAL OF THE MASSACHUSETTS
ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

July Quarterly Meeting
1895

SUBJECT: The Proposed Metropolitan System
of Water Supply.

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are three dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

P.O. Box 2510, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. V.

September, 1895.

No. 3

JULY QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

A quarterly meeting of the Massachusetts Association of Boards of Health was held Wednesday, July 31, 1895, at Gallop's Island, Boston Harbor. After inspecting the Anti-toxine Station, dinner was served. After dinner the President of the Association, Dr. Henry P. Walcott, of the State Board of Health, called the meeting to order.

The Secretary then read the records of the last meeting, and they were approved.

THE CHAIRMAN.—The Executive Committee will report to the Association that it is recommended that there be elected to membership in it the following-named members:—

Dr. A. B. DORMAN, Winthrop.
Dr. THOMAS B. SHEA, Boston.
Dr. E. W. FINN, Dedham.
Mr. A. T. SAVERY, Middleboro.
Dr. A. VINCENT SMITH, Middleboro.
Mr. J. A. BURGESS, Middleboro.
Dr. C. E. BIGELOW, Leominster.
Mr. H. N. SPRING, Leominster.

Mr. A. L. WHITNEY, Leominster.
Dr. OLIVER H. HOWE, Cohasset.
Mr. ELI WORDELL, Taunton.
Mr. E. L. PILLSBURY, Boston.
Mr. B. FRANK WALDRON, Woburn.
JAS. H. CONWAY, M.D., Woburn.
E. CAZNEAU NEWTON, M.D., Everett.
Mr. JOSEPH W. SPALDING, Melrose.
Mr. GEORGE J. OTT, Clinton.
J. H. MCCOLLOM, M.D., Boston.

The committee would also recommend to the Association as a candidate for the vacancy occurring in the Executive Committee by reason of the resignation of Dr. Morrow, of Gloucester, Dr. Walter T. Bowers, of Clinton.

Mr. Bowers was unanimously elected.

THE CHAIRMAN.—The Executive Committee has also received in behalf of the Association, and recommends to the Association that the invitation be accepted, an invitation tendered to it by the authorities of the town of Brookline that the October meeting of the Association be held in that place.

On motion of Dr. Durgin the Association voted to meet in Brookline in October.

THE CHAIRMAN.—Is there any other committee prepared to report at this time? If not, we come now to the incidental business of the Association. Is there anything to be brought before the Association in the way of incidental business?

DR. DURGIN.—I would move that the Committee on Vital Statistics be asked to report in October, so that the recommendations of that committee may be made useful in the next legislature. This committee was expected to report upon the best form of death certificate, and we are very much in need of one which shall be made uniform throughout the Commonwealth. And I think that the committee only want instructions or an invitation to report at a certain date, and we shall hear from them in season to make use of their report next winter. If I am at all presuming in this, I should be very glad to hear from Dr. Abbott, who is the chairman of the committee, and who, I feel very certain, will be glad to make a report in October.

THE CHAIRMAN.—You have heard the motion of Dr. Durgin. Is there anything to be said upon the subject? If not, is it your pleasure that the

Committee on Vital Statistics be requested to make a report to the Association at the meeting in the month of October next?

The proposal was adopted.

THE CHAIRMAN.—Is there any other business?

DR. DURGIN.—Under the by-laws we are required to give notice at a previous meeting before acting upon anything contained in the by-laws. I would therefore give notice now that at the October meeting I will move an amendment by which our assessment shall be reduced from \$3 to \$2.

THE CHAIRMAN.—I only wish to supplement this notice of Dr. Durgin by reminding the Association that the Treasurer is still anxious to receive the assessments for the current year, and that there is no proposal whatever that the assessment for the current year shall be reduced from \$3. The Treasurer intends to collect the full amount this year at any rate.

Dr. Walcott then gave "An Explanation of the Proposed Metropolitan System of Water Supply":—

REMARKS OF DR. HENRY P. WALCOTT.

Now, gentlemen, in regard to the fifth heading upon your orders of notice, "An Explanation of the Proposed Metropolitan System of Water Supply," I presume Dr. Durgin knew what he was about when he in behalf of the committee made the arrangement which he has made; but, considering that your Chairman has lived with this question for the last two years, it is possible that he may say a great deal more upon the subject than there is any necessity for saying, and he will still feel, when he has got done with it, that he has said very little upon the most important subject that has been brought before this Commonwealth in connection with public health matters since the State Board of Health has been established, and I believe that no measure in which the State Board of Health has been concerned will redound more to its credit than the measure which, with the help of my friend on my left here [Mr. Roberts], has recently become a law of this Commonwealth.

The question of a Metropolitan Water Supply, if one means a district greater than the city of Boston, originated in the proposal made some eight years ago by the State Board of Health to the legislature of Massachusetts, that it had become necessary that some far wider legislation should be enacted than any then existing; that is, that the Commonwealth should proceed to say to certain municipalities in the vicinity of Boston that the time had ceased when it was possible for those municipalities to economi-

cally and safely provide themselves with water supplies in the immediate vicinity of Boston. The supplies of pure water had become so far removed from the centres of population that it was absolutely out of the question for any small municipality to obtain a water supply that should be abundant and should be safe in quality.

That recommendation has been repeated in one form or another ever since in the annual reports of the State Board of Health. Two years ago the city of Boston came before the legislature of Massachusetts asking that a commission be appointed for the purpose of investigating the whole question of a larger and better water supply. The proposal, as then made, was entirely in the interests of the city of Boston. The legislature referred the matter to its appropriate committee; and out of the discussion which took place there came the recommendation of a law that the State Board of Health, which had been given the whole subject of the protection of water supplies and the prevention of their pollution by sewage, should undertake this investigation. A very ample sum of money was appropriated for the purpose,—the sum of \$40,000; and the State Board of Health began its investigations. It was carried out, of course, with certain advantages on the part of that Board which a new organization would not have had, because we had the collected experience of the nine or ten years during which we have acted as a commission for the conservation of the water supplies, so that a great deal of detail work was already done. We had in addition to this the great advantage of the experiment station at Lawrence, which had enabled us to determine certain questions with regard to the pollution of water, and as to the safest and best method of measuring that pollution, and also some information as to the means of preventing and of remedying pollutions.

Thus equipped, as I say, we began upon the work, and reported to the legislature of this year a plan, which it is no exaggeration, I think, to say has settled forever the question of the water supply for Eastern Massachusetts. In general terms, that water supply is the water of the South Branch of the Nashua River, to be collected in a great basin above the city of Clinton, to hold, when completed, 63,000,000,000 of gallons of water, a supply for the whole Metropolitan District of two years, assuming that not a drop enters it in the mean time. It might be asked if the river itself is going to be large enough to supply water enough to fill that basin. It will take eighteen months of an average rain-fall in Massachusetts to fill the basin; but, when once filled, no demand which we can now foresee, until the population of the Metropolitan District reaches the sum of 2,000,000 inhabitants, will be great enough to impair that basin. That is, it will be amply sufficient for 2,000,000 of people, using 100 gallons a day, and with that use the basin will be reduced in height only twenty feet in the

average year. So that we have at that particular place, and with this particular scheme, a provision for the population in the vicinity of Boston, embraced in the district, which now numbers about 900,000 inhabitants, until that 900,000 has increased to 2,000,000.

And that is not all. This basin provides an abundant water supply for the city of Worcester, it provides an abundant water supply for every town in the immediate vicinity, it provides an abundant supply for every town lying between Clinton and Boston, so that it may be said that the plan recently adopted provides a water supply for the district extending from Lynn on the north to Brockton on the south and to Clinton on the west, a very considerable section of the State of Massachusetts.

And the satisfaction with which the Board of Health reported that plan was very much increased by the fact that this is but the beginning of a system of water supplies for this portion of the State. This water supply is collected at a point so high that it can all flow by gravity into the existing receiving basins of the city of Boston. Beyond the basin of the Nashua is the basin of the Upper Ware River, which can also be brought into this basin by gravity, not by pumping, by the construction of a conduit only 8 miles long, which will supply between 70 and 80 million gallons a day. Beyond that is an additional supply from the Lower Ware River, which is good for between 50 and 60 million gallons a day, which can also be brought in by gravity. Beyond that is the river made up of the three Swift Rivers, taken at a point where a great reservoir can be constructed, which will add to this supply nearly 200 million gallons a day.

It will thus be seen that this side of the Connecticut River we have a supply available without pumping, by mere gravity, that will suffice for a population of between four and five millions of inhabitants within the district which I have designated. And that is not the end of it; for, crossing the Connecticut River, also to be brought into this system by gravity, is a portion of the Westfield River, and beyond that the Deerfield River taken at a point beyond Greenfield, and those two rivers will double the capacity existing upon this side of the Connecticut. So that there is a provision for a population greater than exists upon any similar area on the surface of the earth at present. That is, the question is, humanly speaking, settled for all time, because it is not within the wildest imagination to conceive — and, in fact, the physical conditions would render impossible — the residence within this district of a population too large to be supplied by the water supplies, which can all be made subsidiary to this great basin above Clinton.

Now, having provided a sufficient quantity, the question is with regard to the quality. Those who are familiar with the districts which I have designated know that they are the hill towns of Massachusetts, and that

for the last thirty years they have been steadily diminishing in population. The population surrounding the South Branch of the Nashua River above Clinton has actually diminished in the last seven years a very considerable percentage. The only increase in any towns within that district has been in the small manufacturing places close to the river, where there have been special reasons for growth, at West Boylston and Boylston. Elsewhere the population has steadily diminished. The country, as many of you know, is substantially on the southern and eastern slope of Mount Wachusett, not a good country for farming, a country where farming has not proved profitable in recent years, and so far from the city of Boston and the great centres of population that the possibility of such expensive cultivation as has gone on in the poor lands about Boston is out of the question.

The next district, that of the Ware River, also lies among the hill towns of the Commonwealth. It takes the western slopes of Wachusett Mountain, and there again is a district which has steadily diminished in population the last thirty years. There is no great manufacturing town there. There is no reason why any manufacturing town should be established there.

The Swift River watershed is more favorably located still for a water supply. The population there has diminished by a percentage double that by which has diminished the population in the Nashua River valley. And, when you come to the Westfield and the Deerfield Rivers, you come to rivers where the population living upon the area draining into them is absolutely less than the population upon the borders of Lake Winnipiseogee, for instance, in New Hampshire. So that so far as the dangers of contamination by sewage, from faecal contamination, the principal source of danger, the water supplies selected are better than almost any now existing in the Commonwealth as supplies for large cities.

And, furthermore, there is very little chance that they will be polluted; but what little chance there is of that pollution has been very wisely guarded against by the legislature, for which our friend here is responsible, by a provision that the State Board of Health shall make certain regulations as to the protection of these water supplies,—and it seems to me one of the fairest things that the Commonwealth has ever done: it seems to me there has been a defect in our water legislation hitherto, certainly in that legislation which has enabled the city of Boston to develop the Cochituate and the Sudbury district,—a provision that the expenses of that protective treatment of the streams shall be borne by the district which gets the benefit of it. That is, that the little town of Oakdale, or any portion of the inhabitants living on the Nashua River, who have been in the habit for years of disposing of their drainage into the Nashua River, shall not be called upon to construct a sewer system, that might be a very serious

burden to them. for the purpose of protecting this great wealthy collection of people here upon the seaboard who take the water. They are to pay the expense of a sewer system, so far as that sewer system exists for the purpose of protecting the water supplies.

So the machinery seems to be abundantly sufficient for keeping this stream in the condition of purity in which it now exists. That condition of purity, as I say, is, so far as the things that concern health go, better than now surround the public water supplies of this district.

But, in addition to all that, this supply is going to give us something we have never had before, at least in the Metropolitan District; and that is a thoroughly attractive water. It seems to me that in recent years, in our discussion upon the matter, we have perhaps dwelt too much upon the purely health side of the problem. That is, we have said to people: Your water is green or yellow or brown. All right. It isn't going to kill you. There are certain crustaceans floating around in it, shooting through it; but they are not worse than minute oysters would be,—they won't hurt you. It is disagreeable, of course. It smells bad: it has a cucumber smell, a fishy odor. All right: it isn't going to poison you. And we have gone so far that we have finally driven the population, so far as they can afford it, into purchasing waters that haven't crustaceans shooting through them, that don't stink, and that are not green or yellow or brown, but are colorless. Now, it seems to me that, when a community, a municipality, proposes to furnish me with a water supply, I have a right to insist that it shall be a healthful water, that it is not going to seriously diminish my health; but I think in the next place it ought to be one I am willing to drink, that I can drink with a certain amount of satisfaction, without holding my nose or shutting my eyes when I take it. Unfortunately, there is hardly a water supply in the vicinity of Boston that has not offended in all these particulars. I live in the university city of Cambridge, where we may be assumed to be possessed of an ordinary amount of intelligence; but we have a green water, then a yellow water, occasionally it is a brown water, and there are living things in it. But our Water Board tells us it doesn't poison anybody, that the health of the city is good; and those of us who don't like it go out and buy spring waters. It doesn't seem to me that is a fair way of treating the question. Water is a commodity, and I think we are entitled to as good a commodity as possible. The grocer, certainly, is not going to be allowed to sell us dirty brown sugar in these days, when we can buy good white sugar for nearly the same price; and I don't know why a municipality should be allowed to impose upon us in the matter of water.

Fortunately, with this great water supply the color is going to be as good as that of Lake Winnepiseogee, which has been an ideal water for a generation. It is not going to smell, and we know that it is not going to con-

tain fœcal contamination. So we have provided you with quantity and we have provided you with quality.

The next question is whether the predictions which we now confidently make upon the subject are going to hold good? It is rather a melancholy fact,—there are a few others here who may have had the same experience,—but I remember, as a boy, walking up in Natick through a portion of the then uncompleted first great water system of Massachusetts, the Cochituate water supply of the city of Boston. The engineer, who was a friend of my father's, was explaining it to him. And I remember distinctly, boy as I was, the statement that it was a great thing that the people of the city of Boston had been wise enough to settle this question forever, that that was the end of it; that some people had taken water from Jamaica Pond, but the people didn't like water from Jamaica Pond; they couldn't get it, it cost a great deal of money; and the wells were getting very bad, and the city wisely had gone ahead and spent a great sum of money, and settled this water question forever. Unfortunately or fortunately, I have lived long enough to see the Sudbury River added to it: and we have got now, in the year 1895, to a condition of things where the city of Boston is absolutely short of good water. The city of Boston hasn't water enough to provide its inhabitants with a satisfactory supply to-day. It is using the waters of the Mystic, which the authorities of the city of Boston long since condemned; and upon any scale, even a scale less generous than that adopted by the city of Boston, the city of Boston will this year serve to its customers more water than falls from the clouds and more water than is collected in its reservoirs. And for the next four or five years, which will be the years of stress upon the system, the city of Boston will have to steadily draw upon reserved waters. So, when it comes to this larger water supply, it will have to spend a certain portion of that supply in making up for the deficiencies of previous years.

Now, I cannot but think, notwithstanding that very melancholy experience,—that one man's life should have seen the failure of the confident predictions that were made in the course of that same life as to the sufficiency,—I cannot but believe, I say, that the basis upon which we have calculated the needs of this district is ample. We have assumed that every human being in the district is to use 100 gallons of water per day. Now, we know that the necessary needs of a family of 5 persons for all the purposes of cooking, drinking, and for any use of water that obliges us to use a pure water, ought not to exceed 5 gallons a head at the most liberal possible estimate; and the question is, What becomes of the other 95 gallons? Of course, a certain amount of it goes into the bath-tub, a certain amount of it goes into the water-closet: but, making every possible allowance you can for the uses of water in any single household, you cannot get it above 35

gallons a head. The domestic uses of water never have exceeded 35 gallons a head in any community. In London, the healthiest great city of the world, among a people who certainly use water fully as freely as we do upon the outside of the body, at any rate (I don't think they use so much of it inside the body, but they use enough of it outside the body), they get on with an average use of 30 gallons a day. Some of the English cities go below that. But, in examining the matter very carefully, we find that an amount of water fully equal to that used in the household per head is used per head of the whole community for manufacturing purposes. Now, it would not do, it certainly would not do in this Metropolitan District, to diminish that quantity by a gallon. The prosperity of the people, the prosperity of the State, to a certain extent, depends upon the prosperity of this Metropolitan District. Now there you have 70 gallons a day.

Then it is also true, which I think will surprise most people, that no system of water supply has yet been devised, no system of water supply has yet been so carefully watched, that there shall not be a very serious wastage. That wastage in certain large cities, even where the wastage is very carefully controlled, amounts to about 15 gallons a head. Of course, you may say that ought to be reduced, and I think all municipalities will say it ought to be reduced; but thus far it has not been essentially diminished, and the question is whether it can be reduced. We have assumed in making our calculations that it is not going to be reduced. We wish, of course, to make a calculation which shall hold good under every condition. Then, of course, there are certain public uses of water for street-watering purposes and extinguishing of fires, which amounts to 5 or 6 gallons a head, as the case may be. So that, after all, considering the life of the Metropolitan District, it seemed to us safe to calculate upon 100 gallons per head.

Now, the question is whether the district can pay for it, can afford to pay a proper sum for that. And the history of water-works in the city of Boston, I think, gives us some very interesting information upon that subject. In the year 1825 a wise mayor of the city of Boston employed the best scientific talent of the day to investigate the question of a water supply for the city of Boston. It was recommended that the city of Boston go to the Charles River, above the dam at Watertown, and take its supply from that point. The report said a great deal of the necessity for a general water supply, which was very wise,—too wise for that generation, because they did not accept it; and then it was stated that this plan might cost something like three-quarters of a million dollars. It was so outrageously extravagant a plan that the mayor did not dare to submit it, did not dare to seriously call the attention of the city government to it; and it slumbered. Five years later another mayor called the question up, and the thing was carefully con-

sidered. Professor Treadwell, I think, was added to the commission. They went over the matter, and recommended going to Mystic Pond and Spot Pond for a water supply; and their scheme went up to a million and a half of dollars. But the interesting portion, and why I brought up this fact of old history, was this: that Professor Treadwell, being an eminently practical man, proved to the city government of that day that the citizens of Boston paid more money in digging their wells and keeping their pumps in order than they would pay if they were taxed for the outlay of a million and a half of dollars for a supply of water which could be had by simply turning the faucet. And the figures which he brought forward to sustain that proposition would certainly be good to-day. I think if any one of us who has a water supply throughout a modern house, with all the conveniences, for which he pays, as I happen to pay in Cambridge, \$20 or \$25, including my stable, and tries to imagine how his housekeeping would go on if he didn't spend that \$25,—how long his servants would stay in his house if they had to carry 30 gallons of water upstairs every morning for the bath-tub or a certain number of additional gallons to be put into the cistern over the water-closet or to do the washing or any other of the various operations which go on in the household,—will agree that there is certainly nothing so important to modern life which we get for so cheap a price as we do water. And there was one suggestion which the late mayor of Boston made in the address which he delivered to the city government in going out of office which, it seems to me, is worth bearing in mind; that is, the question whether a city is not entitled, for the purpose of defraying some other municipal expenses, to get rather more out of its water rates than it now does.

To go back to what I know most about, my own city of Cambridge, where the water system has not been generously managed, we have still gone on, and paid off each year a very considerable portion of our water debt. It is a business undertaking which stands upon the very firmest business basis, and the city of Boston has had a similar experience with its Mystic supply. The Mystic works have paid for themselves,—that account is closed,—and the city of Boston can afford to throw them away to-day, as it proposes to do.

It seems to me that upon the whole question of public health in the first place, and of a small expenditure of money for the purpose of securing a very great good, the recent legislation of the State of Massachusetts is of the wisest and the best. It seems to me, as I said in the beginning, that, whatever else the State Board of Health may have done, the fact that it was able to recommend to the legislature a measure which so commended itself to the legislature, though it involved the expenditure of \$27,000,000,—the largest scheme ever presented to the State of Massachusetts,—

that the legislature adopted it in a single session,—I say I think that, if the State Board of Health had done nothing but that, upon that record we might afford to await the dissolution of the Board, and see something different take its place.

There are certain other portions of the subject which I am not going to speak about, because there are other gentlemen here who can speak about them much more ably than I can. I should like to say of one of them, at any rate, what he is not likely willing to say for himself probably, or will not say for himself. For the fact that this great measure passed the legislature, whatever credit may belong to the State Board of Health, an immense amount of credit belongs to two or three gentlemen who, through protracted committee hearings, familiarized themselves with this subject, and so stated it upon the floor of the House that they satisfied the legislature that this was good legislation, and procured the passage of it. And I say that Mr. Roberts and his associates deserve the thanks of every public health association in this State for the work they have done. I now have the pleasure of introducing to you Mr. Roberts, of Chelsea.

REMARKS OF ERNEST W. ROBERTS, ESQ.

Mr. Chairman and Gentlemen of the Associated Massachusetts Boards of Health,—As has been stated by your honored Chairman, it was my fortune to be so situated during the past year with regard to committee work that I was connected very intimately with the bill to provide a metropolitan system of water supply when it was before the legislature; and it has been suggested to me since my arrival that it might interest you if I talk on the subject from the legislative standpoint. I had not intended to speak upon that phase of the question, but will accept the suggestion if the time permits, and try to convey some idea of the amount of work required to get the bill into shape and steer it through the legislature.

It would be utterly impossible, in the brief time at my disposal, to discuss with any degree of fulness the vast undertaking which is the subject of your consideration this afternoon; and for this reason I shall confine my remarks to a part of the proposition that has been but little understood.

I refer to the selection of the South Branch of the Nashua River as the source of the Metropolitan Water Supply, and I shall present as concisely as possible some of the considerations that moved the State Board of Health to recommend and the legislature to adopt this source.

For many years it has been a popular belief that, when the city of Boston should have exhausted its present sources, it would be obliged to go to

Lake Winnipiseogee, in New Hampshire, in order to get an adequate water supply. It has been thought that the city made a grave mistake that it did not years ago acquire this lake for the purposes of a water supply; and even now, after the Nashua River has been selected, many persons consider we have repeated the error of the past in not going to Winnipiseogee.

The providing of a water supply for the Metropolitan District took definite form in 1893, when the legislature directed the State Board of Health to make investigations and consider the subject of furnishing an adequate water supply to the city of Boston and its suburbs within a radius of ten miles from the State House, and appropriated the sum of \$40,000 to defray the expenses of the investigation.

In considering the problem intrusted to them, the State Board of Health would have laid itself open to serious charges, had it treated the question as one affecting our own generation only.

The furnishing of an adequate supply of potable water for the city of Boston and its suburbs involves the expenditure of a vast sum of money, and it would have been a short-sighted policy indeed that contemplated only the requirements of the immediate future.

The Board did not disregard or lightly pass over the merits of Lake Winnipiseogee as a source of supply for the Metropolitan District; for they had expert engineers make the most careful surveys to determine the practicability of bringing the water to the district, and have also had careful estimates prepared showing the cost of the undertaking.

The distance from the State House to the outlet of the lake, in an air line, was found to be eighty-four miles; and to Alton Bay, that part of it nearest to Boston, seventy-seven miles.

The surface of the lake is about five hundred feet above mean sea-level, so there is sufficient height to furnish water by gravity.

The watershed of the lake, exclusive of its area, is two hundred and ninety square miles; and its area is seventy square miles.

The lake can now be drawn down but three or four feet below its ordinary high-water level. Could the right be obtained to draw it down five feet and use all the water it will furnish, it would yield 208,000,000 gallons per day in the driest year,—a very large supply, but not an inexhaustible one, as I shall demonstrate later.

From analyses of the water made every month from June, 1887, to May, 1889, it was found to be very soft, practically colorless, and to contain only a small percentage of organic matter, its excellent quality being due largely to the opportunity it has in this great lake for bleaching and becoming purified by storage.

There is a permanent population upon the watershed of 35 to the square mile, but this is largely augmented in the summer.

At Weirs and Alton Bay sewage is discharged directly into the lake, and doubtless there exists much similar pollution at other points on its shores.

After careful surveys of the most feasible routes for conducting the water to the Metropolitan District it was found that there must be built 52 miles of masonry aqueduct, 13.4 miles of tunnel, and 19.1 miles of pipe line, making a total of 84.5 miles, which, with the works for elevating and distributing the water throughout the district, would cost in round numbers \$34,500,000.

This vast sum does not include damages to the property owners about the lake or along the 84.5 miles of conduit; nor does it include any compensation to the State of New Hampshire for the water itself or damages to the owners of water rights along the Winnipiseogee and Merrimack Rivers at Manchester, Lowell, Lawrence, and other places.

The gigantic sum represented by these land and water damages, together with the cost of the works, would be the initial cost of the undertaking, and would have to be expended before a drop of the water would be available. This, of itself, is ample justification for not making use of this source.

It is generally supposed that an inexhaustible supply of water could be obtained from Lake Winnipiseogee, but this is not true.

As I have stated, if the right could be acquired to draw the lake down five feet and use all the water it will furnish, we could get 208,000,000 gallons per day in the dryest year.

Boston and its suburbs within ten miles of the State House have a population estimated at 984,300 for the current year.

The figures I am about to quote are conservative estimates, based upon the increase both in population and the use of water for the past forty or fifty years; and without doubt the same ratio of increase in both will continue in the future.

The daily consumption of water in the district for the current year will approximate 84,000,000 gallons.

In 1920 we shall have a population of 2,000,000 in round numbers and a daily consumption of 198,000,000 gallons of water, very nearly the daily capacity of Lake Winnipiseogee.

In 1925 the population will be 2,238,500, and the water consumption 224,000,000 gallons, or 16,000,000 gallons in excess of the capacity of the lake, so that in less than thirty years the district would be forced to seek a new supply; for the only addition which can be made to Lake Winnipiseogee is Square Lake, and this will yield but 40 or 50 million gallons per day,—a source so small it would not be considered worth developing.

It would be presumption on my part to argue to the members of the Associated Boards of Health the importance and necessity of protecting the purity of a water supply.

In every legislative act authorizing a public or *quasi*-public water supply you will find severe penalties imposed for polluting or defiling the water. It is almost as necessary to protect its purity as it is to get the water itself.

It would be utterly impracticable to enact laws in Massachusetts making it a criminal offence to pollute a water supply located in the State of New Hampshire; and, were any such laws enacted, they could not be enforced by the officials of Massachusetts as against citizens of New Hampshire.

Had Winnipiseogee been chosen as the source of supply for the Metropolitan District, we should have been obliged to rely entirely upon New Hampshire, not only to enact, but to enforce the laws for the protection of our water supply. There would be no certainty that such laws would be enacted or, having been enacted, would be enforced, which in itself furnishes a very potent reason for choosing a source within our own limits and under our own jurisdiction.

Were the cost of the undertaking reasonable, the quantity of water to be obtained limitless, and the power of thoroughly policing it possible, we should then find the main difficulty staring us in the face.

Lake Winnipiseogee is one of New Hampshire's chief attractions. Not only do thousands of her own citizens resort to it in the summer for rest and recreation, but other thousands flock there from without her borders, and contribute materially to her prosperity by the large sums of money expended by them annually.

The waters of the lake in their progress to the sea furnish a great amount of power which is utilized to the utmost by New Hampshire manufacturers, and it is inconceivable that Massachusetts or any other State will ever be permitted to take or control the waters of that beautiful lake to the exclusion and detriment of the people of New Hampshire.

The position which Massachusetts would occupy in asking such a privilege would be a most untenable one, when it can be shown that we have many times the quantity of water available in Winnipiseogee right within our own borders,—water that is but slightly inferior in quality, and which can be developed at an initial cost far below the \$34,500,000 that must be expended in merely bringing that water to our doors.

Having given some of the more important reasons for not taking the supply of water for the Metropolitan District from Lake Winnipiseogee, it may be of interest if I outline very briefly the scope and possibilities of the plan which was finally adopted.

The Nashua basin, when completed, will be the largest artificial reservoir in the world. A dam at Clinton 1,250 feet long on top, with a height of 129 feet above the ground, or 158 feet above bed-rock, and having a thickness of about 119 feet at the base and about 19 feet at the water level,

will flood an area of $6\frac{1}{2}$ square miles to an average depth of 46 feet, and will furnish 111,000,000 gallons of water per day in the dryest year. The basin, when filled, will contain 63,000,000,000 gallons of water, and it is estimated it will take some eighteen months' flow of the river to fill it.

The water sources of Boston, exclusive of the Mystic works, are capable of yielding 62,000,000 gallons per day, making the quantity of water available from the combined Cochituate, Sudbury, and Nashua sources in the dryest year 173,000,000 gallons per day.

I have excluded the Mystic source from this estimate because the water is of such poor quality that it will be abandoned for domestic use, at least, as soon as it can be replaced by the metropolitan system.

Estimated by the same ratio of increase in population and per capita consumption heretofore used, this quantity of water will supply the needs of the district until the year 1915, when the demand will just equal the supply.

The cost of the Nashua River source, including remuneration to the city of Boston for its works and sources taken, all land and water damages, and the building of the works, dams, etc., is estimated to be \$27,000,000; and it is expected the water will be brought into the district in 1898.

The Nashua River source was selected not alone by reason of its proximity to the district and the comparatively small cost of its development, but in a large measure on account of the facility and small cost of adding to its capacity.

Between the Nashua and Sudbury watersheds lies that of the Assabet, which will be crossed by the aqueduct leading from the Nashua basin. The Assabet source will yield 28,000,000 gallons per day, and can be turned into the aqueduct at a cost of about \$600,000, thus bringing the capacity of the metropolitan sources up to 201,000,000 gallons per day.

Immediately west of the Nashua River lies the Ware River watershed, the upper portion of which can be developed so that it will furnish 71,000,000 gallons of water per day.

A tunnel 8.72 miles long will convey the water to a point on the Quinepoxet River, whence it will flow into the Nashua River. This addition will cost about \$6,100,000 exclusive of water damages, which will be small, as the territory affected is sparsely settled, and has little or no manufacturing interests.

The district would then have a supply of 272,000,000 gallons per day, or enough to carry it beyond the year 1930, when, as you will remember, the probable demand will be 252,000,000 gallons per day. This supply will also last some years beyond the time when the capacity of Lake Winnipiseogee would have been reached.

The total cost thus far would be just about that of the works for bringing the water of Winnipiseogee to the district.

Looking still further into the future, and in anticipation of the need of more water for the district, we find that this already enormous supply can be nearly doubled by adding the lower Ware River watershed of 56.1 square miles and that of the Swift River which lies west of the Ware.

The Swift River drains an area of 185.7 square miles of territory, containing a population of only 30 per square mile.

By building two dams on this water shed,—one 2,470 feet long and 144 feet above the river level, the other 2,065 feet long and 114 feet high,—it is possible to flood an area of 36.9 square miles to an average depth of 53 feet, thus forming a reservoir which will hold 406,000,000,000 gallons of water, or enough to supply the district, at its present rate of consumption, for thirteen years, if no water flowed into it during that time.

The distance from this reservoir to the State House in a direct line is 64 miles; but, by utilizing natural channels, only 50 miles of artificial channel are required to convey the water to the district, or 34.5 miles less than the length of the conduit from Winnipiseogee to Spot Pond.

To convey the water from the Swift to the Nashua reservoir, a tunnel 27.66 miles in length will have to be constructed; but, if the tunnel from the Upper Ware to the Nashua is so made as to form a part of it, the additional length of tunnel required will be 18.94 miles.

The waters of the Lower Ware would be conducted through this tunnel also, and together with that of the Swift River would increase the daily capacity of the Metropolitan District 200,000,000 gallons, making a total of 472,000,000 gallons per day.

It seems hardly worth while to consider at present the feasibility of any extension of the metropolitan sources beyond the Swift River; yet it should be borne in mind that we have still in reserve the Deerfield River, which, at a point above Shelburne Falls and 89 miles in an air line from the State House, has a watershed of 454.4 square miles, with a population of only 21 per square mile, and could furnish about 450,000,000 gallons of water per day, also the Westfield River, with a drainage area of 179.4 and the same population per mile as the Deerfield watershed.

The Westfield River is 93 miles in a direct line from the State House, and could furnish about 170,000,000 gallons of water per day.

The necessity which will call for the development of the two sources last mentioned is so remote that we may well leave it to posterity to carry on the work we have inaugurated.

I am convinced we have made no mistake, but have acted wisely and well in starting this great public benefit at the Nashua River instead of going to New Hampshire for that which we have in abundance within our own borders.

If I may be permitted a few moments more, I will accept the suggestion

made me by your Chairman, and say a few words on the legislative side of the matter. The fight on the Metropolitan Water Bill began very early in the session. As perhaps some of you know, for the first time in the history of our State we had this year a Committee upon Metropolitan Affairs. This committee was formed to consider all matters affecting what is called the Metropolitan District. The term "Metropolitan District" is somewhat misleading, because at present we have three separate metropolitan districts. There is the metropolitan sewerage district, composed of certain cities and towns within a ten-mile radius of the State House, the metropolitan park district, composed of certain other cities and towns, and the metropolitan water district, composed of still other municipalities, the outlines of no two of these districts agreeing.

When the matters before the legislature were assigned to the various committees, the report of the State Board of Health upon the metropolitan water system was referred to the Committee upon Metropolitan Affairs. Some of the members of the Committee upon Water Supply thought that the Water Committee was the one which should consider all water questions, and that this subject was one which properly belonged to their committee. Accordingly, they made objection to the assignment; and the matter was laid over a day. When it came up for action, there was quite a spirited fight, the result of which was that the assignment to the Metropolitan Committee was negative; and, on the part of the House, the consideration of the subject was given over to the Water Committee. The matter then went into the upper branch for concurrent action, and there it was hung up for some time. Finally, the friends of the Metropolitan Water Bill and the members of the two warring committees came together, and it was agreed that the committees should sit jointly to consider this bill and the great undertaking involved in it. I felt then, and have since been confirmed in my belief, that this joining of the two committees was really what gave us the Metropolitan Water Bill this year. It would have been a great mistake to have given the Committee on Metropolitan Affairs sole consideration of this matter. That committee was composed of members from within the Metropolitan District. The Metropolitan Water Bill affected not only the metropolitan water district, but a large area of country in the vicinity of Boylston and Clinton as well. It would have been very easy to have arrayed the country members against the city members, and almost certain to have happened, had the Metropolitan Committee alone reported a bill.

The two committees came together in joint session, and the State Board of Health, through its chairman, Dr. H. P. Walcott, its counsel, Colonel W. S. B. Hopkins, of Worcester, and its engineer, Mr. F. P. Stearns (who, I am happy to state, has been selected as the engineer of the Metropolitan Water Commission), presented the facts in regard to the Nashua River

source. We had a number of hearings. The twenty-eight cities and towns named in the draft of the proposed bill submitted to us, together with many corporations and individuals who would be affected, were for the most part represented by counsel; and the question was given as thorough consideration in those hearings as it was possible to do.

After the hearings were closed, a proposition was made that a sub-committee of three should be appointed to draft a bill; for it was not thought that the bill submitted by the State Board of Health could properly be reported. A sub-committee was charged with the duty of drafting a bill, which, if satisfactory to the joint committee, would be adopted, and submitted to the legislature as the joint report. It was my fortune to be a member of this sub-committee, which was composed of Senator Bessom, of Lynn, and myself from the Water Committee, and Mr. Jones, of Melrose, from the Metropolitan Committee.

I may say, in passing, that at the close of the first public hearing I had very little hope of accomplishing anything in the way of legislation the current year. The city of Boston as represented by the corporation counsel seemed to have taken the position that it did not want the Metropolitan Water Supply, at least this year; and it was stated openly that the best thing for Boston to do would be to throw its influence in favor of referring the whole proposition to the next General Court. Without the active co-operation of Boston it would be impossible to get any bill through, and the attitude of the city made the outlook for ultimate success very gloomy. After the matter came to the sub-committee, we held repeated conferences with the corporation counsel, Mr. A. J. Bailey, with the result that he soon came to the conclusion it would perhaps be for Boston's benefit to have a bill go through this year. Whereupon he joined heartily with us in endeavoring to get a bill into shape, so it would meet the views of all parties interested.

It may give you a better conception of the nature and variety of the interests, and the general difficulties which confronted us, when I tell you that we had to consult not only the interests of the twenty-eight cities and towns within the so-called Metropolitan District, some of them claiming to have an abundant supply of water and expressing a disinclination to go into the scheme upon any terms, but we had also to consider the interests of seven private companies supplying water to communities within the Metropolitan District; we had to consult the interests of the Massachusetts Central Railroad, $6\frac{1}{2}$ miles of whose track was to be flooded to a depth of 146 feet up through the Nashua valley; we had to consult the interests of the Boston & Maine Railroad, some of whose track would be interfered with; we had to consult the interests of the citizens of Clinton as well as of Clinton as a municipality, they claiming that their sewerage rights and privileges would

be destroyed, or, if not destroyed, greatly impaired; we had to consult the interests of the towns of Boylston and West Boylston as municipalities and of the citizens individually; and we had to consult the interests of the large manufacturing concerns along the South Branch of the Nashua River, not only in Massachusetts, but in New Hampshire. There were a great many conflicting interests at stake; and it was our task to harmonize them, if possible.

We took the bill which had been submitted by the State Board of Health as the basis of our structure, and commenced. If my memory serves me rightly, we drafted and had printed some seven or eight different water bills. As fast as we could get two interests in harmony, and endeavored to get two more, the first two would get by the ears in some way; and we would have to abandon the whole idea and the whole basis upon which we had been working, and begin over again on new lines. We finally succeeded, by yielding a little here and there, in harmonizing all the different interests, so that we were able to draft a bill which met the approval of nearly all the parties interested. The sub-committee reported this bill to the joint committees; and it met their approval so completely that it was reported to the legislature without a dissenting voice,—a somewhat unusual event, considering the magnitude of the matter, and the fact that there were twenty-six members upon the two committees. The bill was reported upon the part of the Metropolitan Committee by Mr. Jones, of Melrose, and on the part of the Water Supply Committee by myself.

Then came, perhaps, the most difficult part. The inhabitants of Boylston and West Boylston, individually and in behalf of their towns as municipalities, had made demands which, while they elicited my warmest sympathy, and personally I should have been glad to have acceded to them, were establishing principles to which I could not agree. The claims they made for damages were of such a nature that it would have been very dangerous, had we yielded to the extent they demanded. They even asked that, where a workman in any of the mills which would be flooded out was obliged to remove to some other place to earn his livelihood, he should be paid his expenses for moving, and remunerated for the loss of his situation, together with all sorts of remote and consequential damages, not alone to the workmen in the factories, but to all the citizens of those towns. We did not go to the extent they demanded, although we yielded somewhat. We recognized the fact that a great hardship will be worked upon the town of West Boylston in particular, because 60 per cent. of its taxable value will be completely wiped out, and 43 per cent. of its population will be practically driven out of the town by reason of the factories and farms where they are employed being rendered useless, thus leaving the town with its debt, and with its roads and its schools and all of its other affairs

to conduct with a greatly reduced amount of property to be taxed, and a less number of people to pay the taxes. So we provided that the community should have some compensation as a community. Evidently, we had not gone as far in this direction as was desired; for, when we got into the House with the bill, the member from that district proposed certain amendments, which would in effect give the town, and the individuals also, all they had asked for. We had to overcome this fresh difficulty by a compromise, for without the country vote the bill could not pass; and, if the member from that section had remained obdurate in his opposition, he would have rallied enough support to have overwhelmed us.

We found it expedient to make one or two more compromises on minor matters, so that, when the bill passed the House and went into the Senate, but two amendments were added to it in that body which affected the substance of the bill. There were three or four, or perhaps more, amendments of the phraseology,—perfecting amendments, as they are called,—in no way affecting the scope or tenor of the bill. So confident were we then of the final passage of the bill that, it being within a day or two of the end of the session, we went to Captain Edgett, the official in the office of the Secretary of State, who has charge of engrossing bills, and asked him to engross the bill, and so expedite matters. We told him what amendments would be adopted in the Senate; and he engrossed the bill, inserting the amendments which we had foreseen, and the bill passed exactly as we anticipated. So it was really engrossed before either branch of the legislature had finally adopted it, and considerable time was saved by so doing.

At one time while the bill was in the House it seemed as if it must surely go over to the next General Court. During the last week of May quite a sentiment was aroused in favor of prorogation on Saturday, in order that a record might be made of an adjournment by the first of June. Accordingly, an order was introduced, and passed in the House, requesting prorogation on Saturday, June 1. The Metropolitan Water Bill was still in the House, and would have to come up for final action that day. Had the attempt to adjourn Saturday night been persisted in, it would have been impossible for the Senate to have given the bill adequate consideration, and pass it through its various stages; and it was openly stated that the bill would be disposed of in the upper branch by referring it to the next General Court, so as not to impede adjournment at the time proposed. That, of course, was not desirable. So the friends of the bill bestirred themselves, and on the Friday before it was to have taken effect moved a reconsideration of the prorogation order. After a spirited debate the motion was carried, and the legislature adjourned over to the next week. The bill then went into the Senate, and with very little debate took its several readings, and finally became a law.

I think, gentlemen, I have occupied all of your time that I ought, much more, I know, than I had intended; and I thank you most heartily for your kind attention.

THE CHAIRMAN.—In the remarks I made I stated this Metropolitan District had waters of various colors and stinks, and all that sort of thing; and it may have been noticed my language implied that there were certain exceptions. There is an exception, I think, in the case of the city of Waltham. Its water is not green nor yellow nor brown, and it does not stink. How long it is going to last I don't know, but I have always believed they had pure water in Waltham. At any rate, Judge Smith will tell us all about it; and I now ask him to speak to you.

REMARKS OF E. IRVING SMITH, ESQ.

Mr. President and Gentlemen of the Association.—It is strange how we have to go outside of our own towns to find out the facts about them, but I have no doubt that our President knows more about the water in Waltham than I do myself. You have listened, gentlemen, to the remarks of our President, and of my friend here who occupied a prominent position upon the committee which had charge of the Metropolitan Water Bill; and you have heard from them a very complete statement of the purposes of the bill and of the way in which it was passed. They have known what they were talking about. I can hardly conceive why I should be selected to say anything further upon the subject, unless it be that I can represent those persons who were almost wholly ignorant about it until they were enlightened by the State Board of Health, and by legislators, like the member from Chelsea. But our ignorance has been overcome in one of the shortest campaigns that it has ever been my fortune to witness. I think that we ought to recognize the fact right here, as an association of the boards of health of the State, the debt we owe to the State Board of Health and to the legislature of Massachusetts, inasmuch as through them one of the most important measures which affects our interests, and which could come to our attention as persons who have a care over the sanitary welfare of the State, has been brought to completion within one single legislative year. A scheme as vast as this, involving so many municipalities, corporations, and persons, would not under ordinary circumstances become a law in a great many years. But in this case we find that the scheme for a Metropolitan Water Supply, contained in the report of the State Board of Health for 1895, was at once taken under consideration by the legislature, and has now become a law. The commission which was provided for has been ap-

pointed, and there is nothing apparently to prevent the prosecution of the great work contemplated by that now famous report.

I said that there has been some ignorance about this matter. The people who composed this Metropolitan District didn't all know that they needed water as badly as the President of our Association has told us they do. They had their own supplies. Certain of the small towns and some of the cities, of which Waltham is one, had and have now a supply of water which they believed would last them for a number of years. They were not feeling the immediate necessity of an additional water supply. There were towns and cities, however, in the district which were under a pressing necessity; and it is due, perhaps, partly to that reason that we have at last obtained a scheme which will supply us all, however great our future needs may be.

Now, I have been surprised that in these towns where there is no present necessity for water, and perhaps will not be for five or ten or fifteen years, there was really so little opposition to this scheme. While some of them came before the legislature and asked to be left out for the time being, still the thinking men in these communities said that at last the right thing had been proposed. I think every one recognized that the State Board of Health had made a report which was sensible, which made a provision for the future, and that the report contained predictions upon which the people could depend; and they said, "Although we are not laboring under the necessities that some of the people in this so-called Metropolitan District are laboring under, yet we favor this scheme, it is a good thing: it has our sanction, and all we want is for you to allow us to use our own water-works and our own supply until we feel the necessity for a supply from the metropolitan scheme." That view was adopted by the committee which had the bill in charge and by the legislature; and it is now a part of the law that cities and towns within ten miles of the State House, which have not now been admitted to the metropolitan water district, may be admitted at any time by the Metropolitan Water Board upon the payment of a proper consideration.

The hour is late, and I do not care to take up much of your time; but I think we might reflect for a moment upon the effect which schemes like this will have upon the eastern part of Massachusetts. There has been a tendency — and I neither praise nor condemn it — to unite the municipalities in the vicinity of Boston in various ways. There has been the metropolitan park district and the metropolitan sewerage district; and now comes the metropolitan water district. How much further unification will take place between these different municipalities I do not know; but we see this, — that, whenever it is good business for them to unite, they have been ready to unite, and legislation has been forthcoming which would enable them to do so.

Now there is but one other consideration that I wish to present at this time. As Boards of Health, we are interested in this matter. We know that there will be a greater and greater demand for water in each of the several towns from which we come that are within this district, and in those places even outside of the district in the eastern part of the State. We know that, as Boards of Health, we are trying to make these cities and towns adopt sewerage systems where they haven't them, and in those places where they have adopted such systems to compel the people to make use of them. That means that there will be a greater and greater demand for water, for convenient sewerage always causes a greater demand for water that will be used in connection with it. The time is coming when these towns cannot depend altogether upon their present supplies. For instance, if it is found in Waltham, and in Watertown, too, that the draft upon the Charles River lowers it, so it goes below a point that is healthful, and so that there are flats exposed which are unsanitary, then it will be necessary for those municipalities to make use of this metropolitan supply; and, as Boards of Health, you are interested, we are all interested, in having them make such use of it. Now, it seems to me it is our function as members of Boards of Health to see that the right sentiment is brought forth in our different municipalities, so that, when this water is needed, it will be procured, and that we should give the people the benefit of what we know about the advantages of this metropolitan system; and, if we do that, we shall be carrying out our part of this great scheme. [Applause.]

THE CHAIRMAN.—Gentlemen, I wish we had some member here from the submerged district of Boylston or West Boylston, so that we might present logically the only portion of the subject which has not been treated upon; but we fortunately do have a representative from Clinton, and it is possible that, when he looks up to the face of that 120 foot dam, he may think that there is a fair chance of Clinton being inundated, and, if so, he probably can speak from his fears, at any rate, and I hope from his wisdom. I wish that Dr. Bowers would say something to us upon this subject from the Clinton standpoint.

DR. BOWERS.—Mr. Chairman and gentlemen, I find myself in the awkward predicament of being asked to speak upon a subject which has already been exhausted. The Chairman of your organization and the other gentlemen have gone into the matter so definitely and particularly that there practically is left little or nothing to be said.

I may say, however, that the suggestion the Chairman made was a very real bugbear to many of the citizens of Clinton, who looked upon this scheme as being one involving the entire wiping out of our district, and in-

cidentally seriously injuring the town of Clinton. Loyalty to my town compels me to say that I believe it to be one of the most beautiful manufacturing towns in the State. As many of you are aware, we are a town of 11,000 people, almost a city; and our vitality is largely dependent upon the prosperity of one large corporation there, the Lancaster Mills. These mills are situated on the South Branch of the Nashua River, only a few hundred feet or rods below the proposed dam; and, of course, the people interested in that concern, and the people in the town who are interested in the vitality of the corporation, thought that this project would seriously impair its vitality and its growth. I am very glad to say that I believe this matter has been so adjusted that we have nothing to fear either from the dam or from the impairment of the vitality of the Lancaster Mills.

There were, of course, other considerations which came up when this subject was discussed; and the merits and demerits appealed to us strongly. As to the merits, of course, we can see that this bill promises the making of a most beautiful lake in our immediate vicinity, which would add very much to the attractiveness of the landscape. It will also furnish the town of Clinton with an additional water supply, of which we are sadly in need. And, incidentally, I may say that the estimated cost of this thing does not seem to me excessive, when you compare it with the cost of smaller water supplies. Take our own, for instance. We have spent in the neighborhood of \$400,000 for a water supply for the town of Clinton, a town of 11,000 people; and that is proving wholly inadequate to our needs. We supply the town of Lancaster also, a town of 2,500 people. So that, if small water supplies cost so much, we ought not to feel, where greater interests are to be benefited, that the larger supplies are so expensive. I think a little sum in arithmetic will show you that the relative cost is very little, if any, greater.

Then, again, we expect to reap, at least some of us do, a great benefit in the difference it is going to make in the disposal of our sewage. We have used the South Branch of the Nashua River, this same branch which the bill contemplates taking, for our sewage,—a scheme which, I think, you will all agree with me was an exceedingly poor one, and should never have been entered upon. I am very glad to say that it is a scheme which did not meet with the approval of the State Board of Health. But, unfortunately, the town, like most towns, was governed at that time by people who regarded it purely in the light of dollars and cents, and merely tried to secure the most ready solution of a difficult problem. The taking of this South Branch, of course, will deprive us to a large extent of the disposal of our sewage in this manner; but I believe (if I am incorrect, I hope to be corrected)—I believe the bill provides that the expense of changing our system of sewers will be borne by the metropolitan water system. So I am hoping

that a more rational, reasonable, and decent way of disposing of our sewage will be one result of this thing. Of course, we had to contend in every way with a small way of looking at this matter; and a great many of our citizens were disposed to oppose it. And I am also happy to say that it was a great pleasure to some of us to be able to tell them that the matter was in the hands of good people, that the State Board of Health, so far as it had any influence in arranging this matter, would see that the town was properly guarded, and that the larger interests of Boston would not be allowed to swallow up the smaller interests of Clinton and the adjoining towns in any unjust way. And I think I may safely say that this is only one other evidence of the liberal and broad-minded manner in which the State Board of Health has cared for the interests of the State of Massachusetts. [Applause.]

THE CHAIRMAN.—If there is any gentleman who desires to speak upon this subject, in the way of question or assertion, we should be very glad to hear from him. It is evident that we can't trust this Association to itself. Dr. Floyd certainly ought to say something upon this subject; and I will call upon him,—Mr. Floyd, of Winthrop. Almost every man here is a doctor, and so he will excuse me for presenting him in this way.

MR. FLOYD.—Mr. President and gentlemen, I am not here to instruct you at all; but I do want to express my thanks for being allowed to be here to-day, and to listen to the interesting addresses, which have given me a fuller account than I have ever had before of the important work which has been in the hands of the State Board of Health for several years, and which, with the help of the gentleman whom I am proud to claim as my representative,—for I live in one end of his district,—has been brought to so successful a completion, as far as legislation is concerned. Coming, I think, from the smallest town in the Metropolitan District, I am impressed with how much the Board of Health have done for us and for the other small towns, not only in this matter of water supply, but in other matters which they have recommended, particularly a general sewerage system. Knowing something of the contest which has been going on for years at the State House,—how every time that a town, and especially a small town, applies for water legislation, it is opposed by other places in the locality of the supply,—knowing how my neighboring town of Revere has tried to get a larger supply,—knowing how my own town has tried to get a supply for itself within its own limits or elsewhere,—I am especially grateful that there have been men broad-minded enough, unselfish enough, to put this matter into such a shape that, no matter how small the municipality, their rights have been guarded; and, as far as Eastern Massachu-

setts is concerned, anyway, the legislature will not be bothered with this endless and selfish, as it appears to me,—and yet perhaps we would all fight for our own town,—this selfish contention for each individual town's rights. I think we have reached a better era in the last five years in our legislation in Massachusetts than ever before. And that is the matter that I simply wanted to express myself upon to-day; and I have wished to thank the State Board of Health and the legislature of 1895 for taking such a broad view of a matter which so concerns the health of Boston and vicinity. Thanking you again, Mr. Chairman, I will not longer trespass upon the time of the Association.

THE CHAIRMAN.—I ventured to make a certain statement in regard to Cambridge, that it was an excessively liberal place; and we admit that every other man is entitled to an opinion, even though it differs from our own. Dr. Cogswell has been very familiar with health' matters in the city of Cambridge for a great many years; and I should be glad, and I know the Association would be glad to hear from him, if he has anything to say on this subject. Dr. Cogswell, of Cambridge.

DR. COGSWELL.—Mr. Chairman and gentlemen, I take it from the form of the introduction, so far as I understood it, that it is expected I now should take the opposite side from that which has been taken already by the Chairman; but I don't propose to do it. On the contrary, I think that all it is incumbent upon me to say at the present time is to join with the last speaker in expressing my satisfaction and pleasure in listening to the addresses, which I wish could be heard by a great many others who perhaps need to hear them more than the members of this Association do. [Applause.]

THE CHAIRMAN.—Well, gentlemen, so long as I am in the position, as I happen to be now, of autocracy, I am not going to allow the harmony of this meeting to be interfered with; and I think we had better adjourn.

DR. DURGIN.—Inasmuch as an ocean steamer is now close by, and we shall lose our boat unless we take it immediately, I move that we adjourn.

The meeting was accordingly adjourned.

JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

October Quarterly Meeting
1895

SUBJECTS: Inspection of Tuberculous Cattle in
Massachusetts; Certificates of Death; Methods
of Disinfection; Methods of Garbage Disposal.

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are two dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

P.O. Box 2510, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. V.

December, 1895.

No. 4

OCTOBER QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

A quarterly meeting of the Massachusetts Association of Boards of Health was held at Brookline, in the Town Hall, on the afternoon of Tuesday, Oct. 22, 1895. Dr. S. H. Durgin, of Boston, presided, and after dinner called the Association to order at about three o'clock, and said:—

We have with us this afternoon a pioneer in bacteriology, the discoverer with Loeffler of the diphtheria bacillus. I have the honor to present to you Professor Klebs, of Germany.

REMARKS OF PROFESSOR EDWIN KLEBS.

Mr. Chairman and Gentlemen,—I am but a short time in your land, and I do not speak English very well; but I must thank you for this reception that you have offered me. I am very glad to be in an association of men that will work for the prevention of disease. As I came here to America, I thought I must see that little land of Massachusetts; for in this land is fulfilled one of my first hygienic dreams. You must know that, when I was a young officer in Berne, Switzerland, I made some investigations in regard to tuberculosis; and I was obliged to differ in this from my old master and friend Virchow, who did not think that the tuberculosis of cattle was true

tuberculosis. I could demonstrate at this time, by experiments with animals, that, if the milk of tuberculous cows was injected cutaneously or given as food to guinea pigs, they would show tuberculosis. That was in the year 1867, nearly twenty-eight years ago. After this demonstration I could say certainly that cases of tuberculosis arise, as we all now know, from the milk of cows; and I spoke of this in Berlin and elsewhere to intelligent men. But the farmers said, "If you kill all my cattle, I will lose my money." However, after so long a time opinions have changed; and I was very glad to express in a meeting of this year in the first speech that I made here in America, at the American Medical Association, that Massachusetts is the first place to have a law introduced with this view. So you can think that I am very glad to meet you who are devoted to the consideration of these difficult questions of practical life. I thank you very much for your reception, and I hope that we shall again have the pleasure of meeting each other.

THE CHAIRMAN.—We have with us this afternoon a gentlemen who has been for over twenty-five years a member of the Brookline Board of Selectmen, a man who is esteemed by the citizens of the town for his long service as an honest and courageous man. I present to you the Hon. Horace James, of Brookline.

REMARKS OF HON. HORACE JAMES.

Mr. President and Gentlemen,—As the chairman of the Board of Selectmen, it becomes my very agreeable duty to extend to you on behalf of the town of Brookline a most cordial welcome on this occasion.

In this connection I desire to say that for such pleasure or profit as may be derived from this meeting our thanks are due primarily to Dr. Chase, the very efficient agent of our Board of Health, for the suggestion that we should invite you to meet with us at this time.

In the subjects which have been selected for discussion to-day we are particularly interested. At the present time the prevalence to a very unusual extent of contagious diseases makes the subject of efficient disinfection one of great importance. The best system of garbage disposal is a problem with which a special committee of the town have been wrestling, without success, for the past three years; and they will doubtless be most happy to receive new light upon the matter.

As a part of the programme of this day's proceedings, you were invited to visit our hospitals for contagious diseases, and also a portion of our water-works. The town, though small in area and, until within a few years, in population, as compared with neighboring municipalities, has not been

behind them in providing such sanitary appliances, and in making and enforcing such regulations, as have been found needful for the safety and health of its inhabitants.

Among these things may be mentioned the hospitals for contagious diseases and a thoroughly good system of water supply and drainage. The hospitals, with the exception of the small-pox building, were built last year; and it is only within the last eighteen months that any urgent necessity existed for them, it having been practicable to take care of the few cases of contagious disease which occurred, at the homes of the patients.

The water-works were constructed in 1873, the population of the town at that time being about 7,000. It is now a little over 16,000. Had time permitted, we should have been pleased to have shown you our works at the source of supply in the West Roxbury district of Boston, where the water is drawn from filtering galleries and driven wells, and not from Charles River direct, as many suppose. In the construction and enlargement of the works and purchase of land for the protection of the water supply there has been spent something over \$1,250,000, with the result that we have what is believed to be an ample supply for many years to come, and of a quality that is not excelled by any water supply in this part of the world. Our sewer system was commenced a few years prior to the water-works, and is being extended year by year, as required. The main sewer is connected with the Metropolitan System. This system of sewers and drains has cost to date nearly \$1,000,000.

But we still need better public bathing facilities. A committee having this matter in charge have submitted a report which will come before the town for action at the meeting to be held on Thursday evening next; and, while the scheme is elaborate and costly, I have no doubt it will be adopted.

THE CHAIRMAN.—I take pleasure in introducing to you, gentlemen, Dr. Francis, one of the oldest members of the profession in Brookline, formerly a member of the Board of Health of this town, and in former years City Physician of Roxbury, at that time in charge of her contagious wards.

REMARKS OF DR. T. E. FRANCIS.

I did not expect, gentlemen, to be called upon. So I am not prepared to say anything particular to-day. I think that Mr. James has given you the principal facts with regard to the present Board of Health, and the care which is taken by this town to prevent infectious diseases. At the time that I was chairman of the board, it was a new board; and we had to

work against a great deal of opposition. Nearly everything which we introduced in the way of improvement was opposed by individuals who felt themselves disturbed by the objections which were made to their want of sewerage and their want of proper out-buildings. We were so successful and proved to be such an efficient board that at the end of the year the board was abolished [laughter]; and for myself, instead of being chairman of the Board of Health, I felt that I had been a bored chairman of health [renewed laughter].

All I have to say is, I am glad that you have now so efficient a board, so much more efficient than the board which was abolished when I was chairman.

THE CHAIRMAN.—I will call upon Dr. Sabine, who was for many years the agent of the Brookline Board of Health.

REMARKS OF DR. G. K. SABINE.

Mr. Chairman and Gentlemen,—I did not expect to be called upon to make any remarks. I am afraid I should not have come, had I expected it. While sitting here, I could not help thinking of the change which has taken place in regard to the working of the Board of Health since seventeen or eighteen years ago, the time to which Dr. Francis refers. Previous to that time I think there were no rules to prevent children attending school here from any house where there was any infectious disease, unless possibly the teacher found it out, and made the children stay away until such time as she might think it proper for them to return. The public carriages previous to that time were used frequently to convey dead bodies to the cemetery instead of a hearse; not only the bodies of those dead from non-infectious disease, but those from infectious disease. Many people all along the brook built drains which led into the brook. Now, of course, here as in other places, it is a very different matter. There has been a very great improvement, rules having been made to prevent children from infected houses attending school, the drainage taken out of the brook, and all of those rules established which exist in most places relative to health matters. As I say, the change which has been brought about in seventeen or eighteen years is certainly very great.

THE CHAIRMAN.—The next thing in order will be the reading of the records of the last meeting by the Secretary.

The records were accordingly read and approved.

THE CHAIRMAN.—The report of the Executive Committee will be omitted for the reason that the hour is late and there is very little before the committee to-day, and it will go over to the next meeting. Is there anything under the head of Incidental Business?

DR. H. LINCOLN CHASE.—Mr. Chairman, I move that the annual dues be reduced from three dollars to two dollars.

DR. JAMES B. FIELD.—To take effect when?

THE CHAIRMAN.—After the annual meeting in January.

The motion was seconded and unanimously adopted.

THE CHAIRMAN.—Is there anything else under the head of Incidental Business? If not, the next thing in order will be the report of the Committee on Death Certificates, S. W. Abbott, M.D., chairman.

THE SECRETARY.—Mr. Chairman, the report is rather an elaborate one; and Dr. Abbott does not feel able to read it to-day. It seems to me better, as long as we are rather pressed for time this afternoon, that this should go over until the next meeting, because I presume there would be some discussion of the subject; and it can be published in the next report.

It was voted that the report be printed and be a subject of discussion at the next quarterly meeting.

REPORT OF THE COMMITTEE ON CERTIFICATES OF DEATH.

Your committee has been requested by the terms of the vote passed at a recent meeting of the Association to "report a list of common terms used as causes of death which boards of health should not accept, and to formulate a certificate which shall be recommended for general use throughout the State." In this vote are embodied two distinct and definite subjects, both having for their object the improvement of the registration of deaths,—a movement which is in harmony with similar action which has been proposed often in the past and in several different countries.

Before proceeding to the subject-matter of this report, it is desirable to inquire, What is the object of the death certificate?

Its object is threefold :—

1. It furnishes a record of an important event in the history of the human being; and as such it presents definite evidence which may at any

future time be used in determining questions relative to the inheritance of property, in settling claims for life insurance and pensions, and in determining questions of survivorship and legitimacy. For these purposes, therefore, the record cannot be too minute in its details; and the greatest care should be exercised in complying with the statutes (Chapter 32 and the amendments thereto) to the fullest possible extent.

2. A clear and accurate record of a death serves as an effective aid in the detection and prevention of crime.

3. The collective opinion furnished by the accumulation and classification of large numbers of individual certificates of death constitutes the definite basis of very much of our medical knowledge, and extends its influence, in fact, to nearly every department of medical science, and especially to that which is the main object of this Association,—public hygiene. The cause of death, the sex, the age, the season of the year, the occupation, should all be stated with the greatest care and accuracy in each and every individual case, since the conclusions to be formed from the whole mass of returns must depend for their accuracy upon the accuracy of these individual certificates.

Medical science is pre-eminently progressive. Hence the terms used in designating the causes of death must necessarily be subject to change, from time to time, to conform to the progress of medical knowledge. Terms which were apparently correct in the early half of this century are now becoming obsolete, and those which we now use as current terms will perhaps in another generation be superseded. As an illustration, it is only necessary to go back twenty-five years in the registered records of the State to find typhus and typhoid fever constantly associated together under a single head as one disease. Hence any list of terms which we may prepare must be considered as temporary only. The same is true of all modern science. The engineer of to-day, in searching for abundant water supplies, discards the bygone superstition of the divining-rod for better and more exact methods of investigation.

In his day Dr. Farr was usually reckoned as the foremost English authority upon the classification and nomenclature of disease, but the generic terms indorsed by him are rapidly passing out of use. This assertion, however, is much more applicable to the generic than the specific terms employed in designating diseases. The terms "diathetic" and "enthetic," for example, as applied to groups of diseases, convey but little significance to the modern physician; and the newer nomenclatures are omitting all reference to the long-used term "zymotic," since the modern discoveries of bacteriologists have shown the true character of the diseases of this class. The *generic* fact that 2,015 persons died of *diathetic* diseases in 1893 in Massachusetts is one of far less import

than the *specific* fact that 1,533 out of this number died of *cancer* or that none were reported during the same year as having died of *gout*. The remark which Dr. Bertillon applies to certain diseases of pregnancy may as well be generalized when he says, "Some physicians willingly apply a definite title to certain diseases now; but no one knows just where we shall find them in the future."

But the terms of our instructions direct us to present a list of terms not to be accepted in written certificates of the causes of death. The following may be laid down as a rule which ought to be adopted and carried out as closely as possible: "To avoid the use of the names of symptoms whenever the names of diseases or of the causes of symptoms can with reasonable certainty be indicated." This was advised by the British Committee of Revision in 1885. It is, however, wise to study this rule carefully, especially with reference to the limitation following the word "whenever," since, as the same authorities definitely state: "The total rejection of symptoms as terms of the causes of deaths would only lead to reckless conjecture."

To follow this rule strictly may not always be possible for several reasons:—

1. Because the obscure nature of the illness or disease of which the person died may prevent an accurate statement.
2. The fact that the certifier or maker of the certificate is called in only at the last moment of life, or even after death, and that no autopsy is permitted, also must necessarily affect the accuracy of the certificate.
3. The age of the deceased also affects the accuracy of the certificate. It is safe to say that the number of defective and inaccurate certificates of the cause of death in infants under one year as well as among persons over seventy years of age—that is to say, at the two extremes of life—constitute fully one-half of the unsatisfactory and ill-defined returns which are received by registration officers. The inability of the tender infant to make known its symptoms limits the attending physician to the train of *objective* symptoms only for the purpose of diagnosis; and, while this is true of infancy, it is true also, though in less degree, at the other extreme of life,—the second childhood. Hence the frequent employment of such indefinite terms as "teething," "infantile causes," and "old age."

In immediate connection with the subject of this report, two improvements in the general registration system in the State suggest themselves, both of which are fortunately, at present, in practice in the city of Boston, the Board of Health of Boston having assumed authority to carry them out. We refer to the following:—

1. The power to require or obtain from the certifying person (usually a physician) further information in case of defective certificates. This

should be made an imperative duty by the enactment of a compulsory statute. It might be accomplished in either of two ways:—

(a) By imposing this duty on the general or state official having this work in charge. This duty has been assumed at times in Massachusetts by the State officer having charge of registration; but, since no requirement exists, the work has consequently been of a spasmodic character.

(b) The same requirement might be imposed upon the local registration officers, the town clerk and city registrars. The difficulty here, however, lies in the fact that by far the greater number of these consists of non-medical authorities, having little knowledge of the requirements necessary for the careful revision of death certificates.

The power to obtain this additional information is already assumed by the state registration officers of Maine, Michigan, and Minnesota; and there is no reason why Massachusetts should remain in the rear in this important matter.

2. The local authorities should also have power to make personal examination of all deaths where no attending physician was present. This power, which in several foreign countries is deputed to a special medical officer, and applies to *all* deaths, might be intrusted to the Board of Health or to the medical examiner of the district.

Your committee desires to call attention to the provisions of a proposed bill which the last legislature failed to pass, but which will undoubtedly be again presented during the coming session. While it may not be perfect in all its details, there are certain features which are worthy of note, and particularly those sections which require all public institutions, hospitals, and asylums which receive patients from without the municipality in which they are located to make separate mortality returns to the State, since it is not quite just that the municipalities should be burdened with the excessive death-rate which such institutions occasionally, and in some instances habitually, create. For example, the town of Bridgewater in 1892 and 1893 had a death-rate of about thirty-three per thousand; but a considerable part of this consisted of the mortality at the State Farm in that town, the actual death-rate of the town's population, exclusive of the inmates of this institution, being not far from sixteen per thousand.

We would further commend a perusal of Dr. Bertillon's report to the Statistical Congress at Chicago in 1893; and, since the entire report may not be accessible, the following paragraphs, slightly modified, are herewith reproduced. While they apply specially to the registering officer, they also contain valuable suggestions for the certifying physician.

RULES TO BE OBSERVED IN DOUBTFUL CASES.

The following are the general rules which we have adopted for the solution of certain difficulties (most frequently caused by incomplete diagnoses):—

I. Incomplete Diagnosis.

1. It is not the duty of a statistical office to interpret diagnosis (that is to say, to guess at what has been left incomplete). It can only register facts as they are formulated.

2. When an organ affected with disease is not specified, the certificate should be entered under the title "other organs."

For example, if the physician writes as cause of death "cancer," without specifying the organ attacked, the certificate should be classed under the title of "cancer of other organs."

3. An operation upon an organ (without specification of the cause which has necessitated the operation) leads us to suppose that this organ was diseased. Consequently, for lack of better information, a certificate in which the only cause of death noted is an operation upon an organ should be recorded under the title "other diseases of this organ."

For example, hysterotomy, given as a cause of death without other and more definite information, implies a diseased uterus. Hence the certificate which conveys this information should be classed under the title "other diseases of the uterus."

II. Doubtful Diagnosis.

1. In doubtful cases greater importance is attached to the seat of the disease than to its nature. For example, "for abscess of the prostate" there is no special title. It should be classed under "diseases of the prostate," and not under "abscess."

2. The presence of a foreign body in an organ should be considered as a disease of that organ. For example, a foreign body in the bladder given as a cause of death should be classed under the title "diseases of the bladder." Nevertheless, a "foreign body in the larynx" or "in the trachea" is to be considered as a cause of death by violence, and should be classed under that title.

III. Choice between Two Simultaneous Diagnoses.

Another question remains to be decided. It very often happens that two diseases are named at the same time as the causes of death: to which of

these causes shall the death be attributed? The following rules are given to solve this question:—

• 1. When death is attributed simultaneously to two diseases, it should first be ascertained whether one is not a complication. If this is found to be the case, then the death must be classed under the primary cause.

Examples :—

Measles and convulsions, record as measles.

Measles and broncho-pneumonia, record as measles.

Scarlet fever and diphtheria, record as scarlet fever.

Scarlet fever and nephritis, record as scarlet fever.

Scarlet fever and eclampsia, record as scarlet fever.

Diabetes and bronchitis, record as diabetes.

Typhoid fever and pulmonary congestion, record as typhoid fever.

Whooping cough and pneumonia, record as whooping cough.

Cerebral hemorrhage and hemiplegia, record as cerebral hemorrhage.

Felon and purulent infection, record as felon.

2. If it is not absolutely certain (as in the preceding cases) that one of these diseases is the result of the other, the question should be settled whether there is not a considerable difference in the severity of the two diseases; and then the death should be recorded under the title of the more dangerous disease. For example, cirrhosis and fracture of the leg. One of these diseases is not the cause of the other. Cirrhosis being fatal, and fracture of the leg only exceptionally so, the death should be recorded as from cirrhosis.

A still more puzzling example, measles and phthisis. There is no proof that measles has been the cause of phthisis (although it may have hastened its progress). Phthisis being a more severe disease than measles, the death should be recorded under the title "phthisis."

This second example shows that the rule occasions some difficulties. The following suggestions may be adopted in certain doubtful cases: Deaths recorded as from

Measles and diphtheria, record as diphtheria.

Measles and small-pox, record as small-pox.

Measles and whooping cough, record as measles.

Apoplexy and senile debility, record as apoplexy.

Heart disease and softening of the brain, record as heart disease.

Cancer and pulmonary phthisis, record as cancer.

3. If the two causes of death are equally fatal, and neither appears to be caused by the other, the death should be recorded under that title which describes the case with the greatest accuracy. Generally, it is the more rare disease; and this is the name which the physician usually writes first. For example, diabetes and tuberculosis, record under diabetes.

The following list comprises the principal terms which your committee believe should be either avoided or modified or further explained when employed in certificates of death:—

Accident.—Specify the method or form.

Albuminuria.—A symptom only.

Anasarca.—A synonyme of dropsy, and usually a symptom only: specify the source or cause.

Anthrax.—A vague term: if *carbuncle* is meant, use preferably the English word "carbuncle"; if *malignant pustule*, use this term.

Apoplexy.—Specify the part affected.

Asthenia.—Too vague.

Asphyxia.—Specify the method.

Atrophy.—Too obscure: use specific term, if possible.

Colic.—Specify: rarely fatal.

Cardialgia.—Too vague.

Cephalitis.—Too vague.

Cerebral.—Too vague.

Childbirth.—Specify as follows: (1) Was the death due to some disease of pregnancy; (2) to some disease or accident incident to delivery; or (3) to some disease following delivery?

Coma.—Specify.

Convulsions.—State the cause, if possible.

Debility.—Too obscure.

Concussion of brain.—State whether accidental, suicidal, or homicidal.

Dentition.—Avoid this term, if possible to be more specific.

Dropsy.—Synonyme of anasarca: state source or cause.

Dystocia.—(See Childbirth.)

Eclampsia.—(See Convulsions.)

Exhaustion.—Too obscure.

Fever.—Specify what sort of fever.

Heart failure, paralysis of heart, cardiac exhaustion.—Avoid these terms if a more definite term can be given.

Hemorrhage.—Specify.

Inanition.—Too obscure.

Indigestion.—Too obscure.

Infantile.—Too obscure.

Malformation.—Specify as to form or part affected.

Miscarriage.—Specify.

Metria.—Obsolete term.

Marasmus.—Too obscure.

Natural causes.—Specify.

Nephria.—Obsolete term.

Old age.—This term should never be used when the exact nature of the cause of death can be stated.

Palsy, paralysis.—Symptoms; specify the cause: state whether due to cerebral hemorrhage, lead poisoning, traumatic or other causes.

Paramenia.—Obsolete term.

Premature birth.—Specify.

Sore throat.—Specify.

Shock.—Specify.

Syncope.—Too obscure.

Tumor.—State location and character.

Your committee further recommends that the foregoing list be printed, and that a copy be sent to each member of this Association, and to such experts as may be willing to revise it, with the request that they will amend and revise the same, and that the final revision be printed for general distribution.

With reference to the final clause of the vote of the Association, your committee believes that the present form of certificate of death is adequate to its present uses, provided that the blank form is enlarged, and a condensed list of the foregoing terms is printed upon the back in addition to the usual extract from the Statutes.

THE CHAIRMAN.—The next item on the programme is a paper on "Efficient Disinfection" by H. Lincoln Chase, M.D., of Brookline.

EFFICIENT DISINFECTION.

BY H. LINCOLN CHASE, M.D., BROOKLINE.

Sternberg defines "disinfection" as "the destruction of the infecting power of infectious material. The object of disinfection is to destroy infectious material of all kinds, wherever it may be found, and thus to restrict the prevalence of contagious diseases."

"The most satisfactory tests of disinfection are those which are made directly upon pure cultures of known pathogenic bacteria, and we have now very extensive experimental data relating to the practical germicide power of various physical and chemical agents tested in this way."

The kind of germ, the presence or absence of spores, the nature and quantity of associated material, the number of bacteria, the time of exposure to the germicide, the temperature at which the exposure is made, the degree of dilution of the disinfecting material, and, finally, the honesty and intelligence of the person intrusted with the work of disinfecting,—all these are most important factors in the problem of efficient disinfection.

Heat is undoubtedly the most potent agent available for the destruction of infectious material.

Experiments have demonstrated that those species that do not form spores are killed at a comparatively low temperature, and that the spores of even the anthrax bacillus and of the tubercle bacillus are quickly destroyed by the temperature of boiling water.

Cold, on the other hand, does not destroy bacteria. Prudden has shown that the typhoid bacillus still retains its vitality after being frozen for one hundred and three days; and Cadéac and Malet have shown that portions of

tuberculous lung, kept in a frozen condition for four months, still produced tuberculosis in guinea pigs.

Exposure to direct sunlight is fatal to many species of bacteria, and even diffused light has some germicide value.

An induction coil of electricity has decided germicide power.

Desiccation is sufficient to destroy some pathogenic bacteria, and very promptly. Bouillon cultures of the cholera spirillum, dried upon a culture glass, Koch states, will not grow after three hours. On the other hand, the tubercle bacillus and the bacillus of diphtheria resist the effect of desiccation for several months.

Oxidizing disinfectants, such as chlorine, iodine, iodine terchlorine, are numerous and useful, among which chlorinated lime is one of the best for practical purposes. It owes its germicide value to the amount of hypochlorite of lime it contains. Of the acids used as disinfectants, liquid sulphurous acid Sternberg found efficient for destruction of micrococci in two hours in as weak a solution as $\frac{1}{2000}$ by weight; and the great Japanese bacteriologist, Kitisato, found it would destroy the typhoid bacillus if only $\frac{1}{4}$ of 1 per cent., and the cholera bacillus if only $\frac{1.5}{100}$ of 1 per cent. This germicide, therefore, seems to deserve more attention as a practical disinfectant than most of us are giving to it.

Sulphurous acid in the dry form, however,—*i.e.*, sulphur dioxide anhydrous,—Sternberg and others find, has comparatively little disinfecting power, though in the presence of moisture it forms H_2SO_3 ,—*i.e.*, liquid sulphurous acid,—and this is a sufficient disinfectant in the absence of spores; but, in the presence of germs that multiply by spores, it has been demonstrated that it does not efficiently disinfect. Hence the recommendation of the Committee on Disinfectants of the American Public Health Association in 1887,—that fumigation with sulphurous acid gas alone, as commonly practised, cannot be relied upon for the disinfection of the sick-room and its contents, including bedding, furniture, infected clothing, etc.; but the committee recommended instead that all surfaces should be thoroughly washed with the standard solution of chloride of lime, diluted with three parts of water, or, best of all, a $\frac{1}{1000}$ solution of corrosive sublimate. As an additional precaution, it recommended at that time fumigation with sulphur,—a practice found liable, in our experience, to ruin articles moistened by the $\frac{1}{1000}$ corrosive sublimate solution. Behring, with two colleagues, published a work on disinfection about a year ago, in which sulphurous fumigation is only once mentioned,—that was in disinfection of ships,—and there only to condemn it.

The problem how to enforce our Public Statutes as to disinfection has received considerable attention by our local Board of Health, and I would like briefly to outline the method used here to secure it.

Upon the death, recovery, or removal of a person infected with small-pox, diphtheria, scarlet fever, etc., the Public Statutes require: "the householder shall disinfect to the satisfaction of the Board of Health such rooms and such articles therein as, in its opinion, have been subjected to infection; and any person neglecting or refusing to comply is liable to be fined \$100."

The board gave notice in its circulars of orders, suggestions, etc., a few years ago, that final disinfection, to be satisfactory to the board, after diphtheria, scarlet fever, and small-pox, must be done by the board; and it appointed a person to do it under the supervision of the sanitary inspector and the agent of the board. It also announced that disinfection would be done free of expense, where the householder is unable to pay for it.

The directions for the men employed to disinfect are as follows, and were adopted Jan. 1, 1895:—

OFFICE OF THE BOARD OF HEALTH,
BROOKLINE, MASS., Jan. 1, 1895.

DIRECTIONS FOR DISINFECTION.

The men employed to disinfect shall be provided with skull-caps, overalls, and blouses of canvas or linen; and, after the work is done, these should be placed in bags, the latter moistened in a disinfectant. On leaving the room, the soles of the shoes should be wiped off, and the hands and face should then be washed in soap and water. On reaching home the overalls, blouses, and caps should be disinfected by boiling, baking, or by washing in a $\frac{1}{1000}$ solution of corrosive sublimate.

The rooms to be disinfected having been abandoned, the door should be locked, and no one permitted to enter for twelve to twenty-four hours previous to the arrival of the disinfectors, during which time the particles of dust and any infectious materials suspended in the air are given time to settle.

The liberation of steam in the rooms somewhat hastens the process of settling. The disinfectors should be provided with sheets and bags of various sizes moistened with corrosive sublimate solution ($\frac{1}{1000}$), sponges, scrubbing-brushes, mops, clean, coarse towels, etc., together with plenty of disinfecting solution (or the tablets of corrosive sublimate of known strength), and hot water. In some few cases the necessary articles for fumigation will have to be carried in addition to those above mentioned, also apparatus for making steam in the room, in order to make the fumigation more effective, if used.

Before beginning the work, and at intervals during it, the disinfectors should take the precaution to spray or gargle their throats with disinfectants; *e.g.*, boracic acid or sulphurous acid solution.

They should be vaccinated every five years, so as to be ready to disinfect after small-pox.

First, the furniture is covered with sheets moistened in corrosive sublimate solution, and the various articles to be removed are placed in the bags. The floor, window-sills, and all surfaces on which dust may have lodged should now be

mopped up or wiped with coarse towels moistened with a hot solution of corrosive sublimate ($\frac{1}{1000}$) wrung out at frequent intervals in a wooden or paper pail containing the solution.

The walls of the room are now to be wiped down with the solution ($\frac{1}{1000}$), if painted or covered with oiled or glazed paper, or even if of cheap or destructible paper, later to be removed. If the wall paper is very valuable, but liable to be damaged by even slight moisture, it can be rubbed down with fresh glutinous brown bread, fixed in a frame, and then dry wiped to remove the particles of bread.

The furniture and objects which have been placed in the moistened sheets and bags can now be removed from their wrappings.

The furniture is brought, piece by piece, to the centre of the room, and the sheets removed. Cheap mattresses and any other cheap article, if badly infected, must be burned.

Expensive mattresses or blankets, when infected, can be wrapped in sheets saturated with a ($\frac{1}{1000}$) solution of corrosive sublimate, and taken to a steam disinfecting or naphtha cleansing establishment. Slightly infected carpets, also mattresses, should be lightly and carefully sponged off with the sublimate solution ($\frac{1}{1000}$), and then be placed where they can dry rapidly.

Polished furniture can be wiped off with a sponge moistened with the same solution.

Woollen blankets can be soaked in a ($\frac{1}{2000}$) warm (not hot) solution of corrosive sublimate, in wooden or stone tubs, for twenty-four hours, and then washed out; but they are liable to shrink somewhat. All articles that can be boiled without injury should be boiled for an hour. Some few articles of clothing can be treated by baking, and a few by fumigation followed by prolonged airing out of doors, in the sunlight; but the other methods are superior, if practicable.

The floors, bedsteads, chests of drawers, windows, doors, wooden mattress, frames, etc., should be scrubbed or wiped off with hot disinfectant solution, ($\frac{1}{1000}$) corrosive sublimate. After disinfection is over, the rooms should be well aired for at least twenty-four hours.

If the above process for any reason is not practicable, 4 pounds of sulphur to the 1,000 cubic feet can be burned, after first warming and moistening the air in the room by use of steam or otherwise, remembering, however, that the colors of the paper are liable to be somewhat bleached, and metal objects will be corroded.

Where fumigation is necessary, it is never to be done while articles in the room are wet or where metallic surfaces are exposed; for damage is sure to result. Complicated gas fixtures should be dry wiped and removed from the room before fumigating. Fumigation is to be done only where other measures are not practicable. The room should be tightly closed, and exposed to the fumes for from twelve to twenty-four hours, never less than twelve. The rooms adjoining the sick room or rooms should be exposed to sunlight, and an abundance of fresh air admitted to them (the longer, the better) before they are reoccupied by children.

When questions not covered by these instructions arise, the disinfector will ask for further instructions from the agent of the board.

H. LINCOLN CHASE, M.D.,

Agent of the Board.

In preparing the above, the writer has followed the instructions given by Sternberg, Esmarch, S. W. Abbott, and Nuttall.

We have not yet worked out the entire problem of efficient disinfection; but we are all of us, I believe, relying less and less on sulphur fumigation, till recently a word to conjure with. In Brookline, except for our Board of Health ambulance, and for places infested with bed-bugs, we very seldom employ it. We are willing to endure the criticisms of the ignorant till such time as the cautions of Welch, Prudden, Sternberg, and other pathfinders in sanitary research, shall be heard and obeyed, and more reliable means of disinfection, however cheap and popular the old may be, are generally adopted.

THE CHAIRMAN.—Dr. Worcester, who was to discuss this paper, having been obliged to leave, I will call on Mr. William F. Morse, of New York City.

REMARKS OF WILLIAM F. MORSE, ESQ.

Mr. Chairman,—Upon the question upon methods of steam disinfection I propose, with your permission, to make a slight departure from the line of argument of the last speaker, and to present some notes upon a new apparatus for steam disinfection for the use of hospitals, public institutions, and municipalities, which has been lately examined and reported upon by eminent sanitarians in Great Britain.

A remark made more than a year ago by Dr. Abbott, secretary of the Massachusetts State Board of Health, to the effect that "this country was a long way behind European countries in the adoption of steam disinfection," has led to the examination of some of the apparatus in use on both sides of the water. The secretary of the Maine State Board of Health, in a little pamphlet reprinted from the report of the board of last year, entitled "Notes on Steam Disinfection," gives a short synopsis of several methods in use in Europe, contrasting the relative advantages of steam disinfection under high pressure with disinfection by steam not under pressure, but "flowing in a free current through the goods to be disinfected." I have been at some trouble to obtain reliable reports from the low pressure apparatus, and had a correspondence with the inventor and manufacturer of the one which has been longest in use, of which there are many examples in Northern Europe. This is the Reck disinfector made in Copenhagen.

The main principles of operation of this apparatus are the use of steam at $1\frac{1}{2}$ pounds' pressure per square inch as against high pressure apparatus which requires a 20 pound pressure per square inch, the passage of the steam through the goods to be disinfected, and the condensation of the steam within the chamber by a shower of cold water without saturation of the goods.

The following description taken from the *Sanitary Record*, published in London, September issue, 1895, may be quoted as giving a clear idea of the invention in the shortest space:—

“His apparatus, then, is an unjacketed chamber. In it is a basket made of galvanized wire-work, covered with a coating of what may be called cotton felt. This basket is large enough to nearly fill the chamber, and is made and fitted so as to slide in and out with facility, at either end or at either side, its motion resembling that of a sledge. Bearing in mind that saturation tends to diminish the action of heat, the articles to be disinfected should be first thoroughly dried and in that state put into the basket. The basket is then pushed into the chamber through the entrance door, and shut in, the entrance and exit doors being both secured by bolts and screw-nuts that render the whole steam-tight.

“Steam being then requisite, it must have been previously provided. It may be derived from any engine-boiler without appreciably affecting its working power for driving or for other purposes, or a special boiler may be provided and made ready at a very small cost. Other incidental fittings are included with the apparatus.

“As, at the time of commencing operations, the interior of course contains a quantity of atmospheric air, provision is made for its exit by the opening of a pipe at the bottom corner; and immediately afterward steam is turned on through a pipe at the top. The first effect is for the steam to drive out the air at the exit, with as much promptitude as would be exhibited by a colony of rats on the entrance of a ferret. The forcing out of all the air is soon indicated by the issue from the exit of steam, rendered visible as before described.

“The exit is then closed; and the pressure of steam in the interior instantly operates, increasing it until it is equal to $1\frac{1}{2}$ pounds to the inch, in addition to the atmospheric pressure of $14\frac{1}{2}$ pounds, making in all 16 pounds, that being the maximum required or permitted. When that maximum is reached, a lever is automatically actuated by the pressure within, so as to shut off the steam all but enough to continue the pressure named, which is thus uniformly maintained for thirty-five minutes.

“During that time experimental observation demonstrates that the steam (slight as its pressure) thoroughly penetrates every part of the fabrics or articles under treatment, however thick, inducing a continuous heat equal to 222 degrees,—that is, 10 above boiling point,—which is amply proved to be so completely effective as in half an hour to kill anthrax spores (the most tenacious of life known), which are ordinarily capable of resisting and remaining alive, though subjected to a 5 per cent. solution of carbolic acid from four to six days. Such half-hour result has been obtained, though the spores were placed in the centre of a mattress rolled up in

blankets; and a registering thermometer, placed in like manner, indicates the stipulated heat on subsequent examination, thus showing what such a very slight pressure of steam is capable of doing.

"We have said that the chamber is not jacketed; but a little distance from the top there is fixed instead a curved sheet of metal, forming a cover for the basket in the manner of an umbrella. The prescribed time for disinfection being ended, the steam is shut off, the exit-pipe at the bottom opened, and a flow of cold water admitted at the top. The cold water, conducted by the cover to either side of the chamber, then rushes down and makes for the exit, the cotton felt before mentioned preventing the contents of the basket from being splashed. The interior heat is so intense in its effect that the water, though it proceeds with great velocity to the exit, runs thence steaming hot. Simultaneously, and in corresponding proportion, the steam is rapidly condensed, and tends to create a vacuum. This is anticipated by the provision of an automatic valve, which, as soon and as fast as the steam condenses, allows an equivalent quantity of air to enter, and so to secure the requisite equilibrium, the air entering with an audible blowing noise, in evidence of the existence and purpose of the valve, until the air has completely replaced the steam.

"By that time the water at the exit runs cold, the flow of it is shut off, the exit door opened, the basket drawn out, the disinfected articles, with a barely perceptible tinge of damp upon them, are removed, and aired by warming arrangements for that purpose.

"We write after seeing the whole process through, and such is a description of the apparatus and the manner of using it, as recommended for adoption in most cases. To meet special requirement, the same principles are otherwise applied by a different mechanical arrangement that proceeds upon precisely the same theory, and secures corresponding results in their entirety. In whatever manner the principles are applied, the disinfecting chamber may be either circular, oval, or rectangular, with height enough to allow of the hanging of the articles of clothing therein, thus insuring that they run no risk of being creased by folding.

"The entire apparatus, in any shape or size desired, may be stationary or mounted upon wheels, so as to be readily portable, the latter arrangement including a boiler, so that the disinfecting process can be applied with great facility in different places at very short notice.

"Apart from its great efficiency, the primary recommendation of this apparatus is that the pressure of steam required is so slight. The expense of controlling such pressure is therefore very little, there is no necessity for the costly strength that is essential where a high pressure is adopted, and there can never be any chance of a dangerous catastrophe. The economy both of initiation and working is therefore very marked."

That there is great need for these disinfecting plants will be admitted by any one who will consider the question for a moment.

In Great Britain alone there are four hundred disinfecting plants in use in public institutions and municipalities. This is a proportion of about one to every hundred thousand persons. In Denmark there is a disinfecting plant for each ten thousand persons, and their use is being continuously extended. In the United States, with a population of more than sixty millions, I venture to say that, if the numbers were accurately estimated, there would not be more than fifty satisfactory disinfecting plants of all kinds found in use.

The correspondence, inquiries, and investigations now being actively pursued by health officials indicate great interest, even anxiety, to obtain the best systems consistent with the utmost economy.

The efficiency of the Reck disinfector has been verified by the report of a committee appointed by the city government of Copenhagen, by the report of the surgeon-in-chief of the Danish Royal Army, by the head of the medical staff of the Danish Navy, by the report of medical authorities of more than one hundred and fifty institutions and towns in Denmark, Sweden, and Norway which employ this apparatus, and by the report of Dr. Read of Stafford, England, who made a thorough test of the disinfector in England, assisted by a half-dozen medical officers of cities and towns.

There can be no doubt of the efficiency of the apparatus after the experiments, tests, and practical uses by all these gentlemen.

The question of relative cost to install a disinfecting apparatus depends mainly upon the expense for making the steam cylinder. A steam chamber which must carry a pressure of 40 to 50 pounds must be heavy and strong to resist the strain. The English disinfectors are universally double-jacketed and rectangular in shape. There are two chambers, one within the other, with a space of 2 inches between. These have to be supported by stay-bolts to resist the strain, which adds greatly to the expense of the construction. Steam disinfecting appliances now used in Boston are single cylinders, circular in form, and the introduction of the steam and heat is obtained by coils of steam-pipe at the top and bottom; but here the chamber must be able to withstand a pressure of 50 pounds per square inch. The low-pressure apparatus adopted by Mr. Reck does not require the use of heavy steel chambers, as these can be made very much lighter. There are no interior pipes to take up the room; the full area of the chamber can be utilized; the doors, car, tracks, and steam attachments are lighter and more simple than in the high pressure. All this is a saving of expense.

Where a boiler has to be used specially for the steam disinfector, there is a still greater economy, as it only requires a 4-horse power boiler with a pressure of $1\frac{1}{2}$ pounds of steam to do the work which in a high

pressure apparatus would require a 25-horse power boiler with a minimum pressure of 20 pounds. The room occupied by each is about the same.

A comparison of the relative cost of a given size, 7 feet long, 3 feet in diameter, circular form, or 3 by 4 feet rectangular form, which would be suitable for a large hospital or for a town of ten thousand people, shows that, while in Denmark this would cost with the boiler about \$350, in England it would cost about \$1,000, and in the United States not far from \$1,200; and, making due allowances for the increased cost of labor and material in this country, it seems probable that a low-pressure disinfecting plant could be installed at about one-half the cost of the high-pressure systems.

If this be true, then the advantage in point of economy of the low-pressure system is greatly superior to the other.

If the efficiency of the work done is as perfect as it is in the high-pressure methods, then there would appear to be a strong reason for the introduction of this more economical means as against the expensive ones now usually employed, and a powerful argument in strengthening the hands of the health officers when asking for appropriations to construct disinfecting apparatus, the necessity of which is admitted to be imperative. Cities and towns that annually destroy more than twice as much infected goods and articles as to defray the cost of a disinfecting plant would have no reason for objecting to the outlay for this purpose on the score of economy, and it would furnish the health officials with a weapon against the spread of a contagion which can be hardly equalled.

It can be brought into use in connection with the heating apparatus of any large building where steam is constantly employed, and can be operated without the necessity of a skilled engineer's constant attention, as the work can be done by any one in the employ of the Health Department.

It is probable that within a very short time a low-pressure plant after the designs of Mr. Reck will be in operation in this country; and it will be interesting to note its usefulness and efficiency as compared with the more elaborate, expensive systems of high pressure.

THE CHAIRMAN.—We shall be glad to hear from Dr. Peters.

THE DISINFECTION OF FARM BUILDINGS, STABLES, AND
SIMILAR PLACES.

BY AUSTIN PETERS, M.R.C.V.S.

Mr. Chairman and Gentlemen,—I have been invited to make a few remarks in concluding the subject of efficient disinfection from a veterinary standpoint. Boards of health, in the performance of their official functions, may be called upon to disinfect stables where cases of glanders have occurred among horses, barns where tuberculous cattle have been kept, piggeries after outbreaks of infectious swine disorders, or these buildings may require disinfecting after outbreaks of other diseases not mentioned above. The means and methods of disinfecting stables, barns, and similar buildings, may vary with the appliances conveniently available for accomplishing the desired object, and also depend much upon the construction of the buildings, their finish, and the value and condition of the materials of which they are made. In some cases the question of the disinfection of harnesses, halters, blankets, curry-combs, brushes, pails, and various utensils, has to be considered; and it is possible that under some circumstances railroad cars would be required to come in for a share of purification. Then again, in some instances, it would be necessary to destroy litter and manure; and in other cases earth might have to be carted away and replaced with fresh material.

There is an old Scotch saying, that "there are other ways of killing a dog besides choking him with butter"; and I think it holds good in a consideration of this topic. It is not so much what we use, or what steps we take to accomplish a given result, as it is the care and thoroughness with which the work is done. The premises to be disinfected should first be looked over, and then the best means for cleaning them up can be decided upon.

There are two great factors that, it must be borne in mind, are valuable, not only for purification, but for preserving health as well. These are fresh air (oxygen) and sunlight. Their presence is necessary in carrying out our work, and their continuance should be insisted upon in all stables for the maintenance of health.

Fire is another very effective destroyer of germs; and a certain way of disinfecting an inflammable structure is to touch a match to it, and let it blaze. In this way we are sure of the admittance of the fresh air and sunshine already advocated, after completing the first steps of the disinfecting process. This method of procedure is, as a rule, too expensive to carry out in its entirety; but it can often be done advantageously to a limited extent

by making bonfires of old mangers, worn-out floor boards, straw, rubbish, possibly worn-out halters, blankets, harness, etc., and in some diseases by the cremation of the carcasses of deceased animals.

Steam is another valuable agent for killing bacteria, and in many farm barns there may be a boiler connected with an engine or for cooking feed. Here a hose (an ordinary $\frac{1}{2}$ -inch rubber hose will do) can be connected with the boiler; and then a man may use it, putting a pair of thick woollen mittens on to protect his hands, and bringing the live steam in close contact with every surface or nook and cranny to be disinfected. The planks should be steamed until they fairly squirm.

Whitewash is another valuable agent for cleansing and purifying stables and farm buildings, especially if put on when freshly made, hot, if possible. It may be applied with a brush or it can be very thoroughly and rapidly put on by means of a garden force pump. For this purpose it must be mixed thin enough to readily go through the pump.

Three years ago this winter I was engaged a portion of the time in working for the New York State Board of Health in investigating bovine tuberculosis in Westchester and Orange Counties. It was in these localities that contagious pleuro-pneumonia had been especially prevalent a few years before; and I could not fail to be impressed by how thoroughly the United States Department of Agriculture had stamped it out, and how effectively the farm barns had been disinfected. In thinking over what I wished to say this afternoon the other day, it occurred to me to write to Dr. Salmon, chief of the Bureau of Animal Industry, asking about it; and I received the following reply:—

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY.

WASHINGTON, D.C., Oct. 1, 1895.

DR. AUSTIN PETERS, 40 Water Street, Room 45, Boston, Mass.

Dear Doctor,—Referring to your letter of the 28th ult., our disinfection in the pleuro-pneumonia work was thorough because we had a special disinfecting corps, which gave their whole attention to that subject. The buildings were thoroughly prepared for disinfection by removing rotten wood and all obstructions. The floors and walls were then washed with a bichloride of mercury solution; and, finally, the whole interior of the building was covered with a whitewash made of lime, containing about half a pound of fresh chloride of lime to the gallon. This was put on with a force pump and hose, the pump being a large and powerful one, and requiring three or four men to work it. The secret of our success was, therefore, good material and its thorough application.

Very respectfully,

D. E. SALMON,
Chief of Bureau.

This mixture of chloride of lime with whitewash is an excellent one.

Corrosive sublimate is a valuable germicide, but it must also be remembered that it is a dangerous poison. I have had it used extensively in disinfecting cow barns, and never with any bad effects upon the cattle, that I know of. When it is used to wash out mangers and the wood-work around the heads of the creatures, where they can lick the walls or partitions, these places should always be carefully washed off afterward with clean water, and wiped dry, before returning the animals to their stalls.

I usually have the floors of a cow stable scraped clean, and then washed with a corrosive sublimate solution of 1 to 1,000, the walls, mangers, etc., are gone over with a whitewash brush and a corrosive sublimate mixture. Here 1 to 2,000 is strong enough; and, after it is dry, whitewash is put on over it. If steam is available, it can be used in conjunction with the whitewash and bichloride.

In fancy barns, with hard-wood floors and matched sheathing, often shellacked or varnished over, the corrosive sublimate wash alone can be used, afterward washed off; and, if the varnish is injured, it can then be done over.

Gaseous disinfectants penetrate into every crevice. Therefore, if effective germicides, their action is very thorough; but at the present time it is considered doubtful if sulphurous acid vapor is a very certain destroyer of microbic life. A better vapor is chlorine, made by mixing a small amount of black oxide of manganese with rock salt in a suitable receptacle, and pouring over it sulphuric acid with a little water added. Where a gas is used, the doors, windows, and ventilators must of course be tightly closed. In outbreaks of infectious swine diseases, or in septic pneumonia in horse stables, it may be necessary, in order to make disinfection thorough, to cart away earth from pens or from under piggery or stable floors, and replace with clean material from a neighboring sand or gravel bank.

THE CHAIRMAN.— Shall we hear from Dr. Osgood on this subject?

DR. F. H. OSGOOD.— Mr. Chairman, I do not think I can add very much to what our friend, Dr. Peters, has said on this line; and I won't occupy your time.

THE CHAIRMAN.— Perhaps Dr. Chapin, of Providence, will tell us something about disinfection by formalin, discussed recently by Dr. Kinyon.

REMARKS OF DR. C. V. CHAPIN.

Mr. President and Gentlemen,—I can only repeat what I heard Dr. Kinyon say at the meeting of the American Public Health Association in Denver. He suggested the use of formalin. This is a 40 per cent. solution of formaldehyde; and formaldehyde is certainly a very powerful gaseous disinfectant, which may be used for the disinfection of rooms. I do not know that he had ever actually tried it in a room as we health officers have used it in medical disinfection, but he has used it in a large tank and in small receptacles. He found it extremely efficient, and found it would penetrate through many thicknesses of blankets, and in a very short time would kill the ordinary bacteria. He suggested that, if used in a room, two or three pounds of formalin should be placed in a vessel, and that put in another vessel of warm water, and the room closed up and left four or five hours. Then it would be necessary to air it for twelve hours, and from his experience he thought it would work well. Yesterday I made that experiment, but have not yet learned the result.

This formalin, as you know perhaps, is quite expensive. It costs in large quantities, a hundred pounds, eighty cents a pound; but the formaldehyde can be prepared by burning methyl alcohol against a platinum cone. Dr. Kinyon said that an apparatus had been devised for that purpose. I have not yet been able to get hold of one, but it certainly would not be very difficult to devise something of that kind. It remains for practical experience to determine whether this method is effectual, one that can be used in the ordinary rooms of dwellings. We all know that such a room is not like a tight tank used for steam disinfection. We know that a gaseous disinfectant must be used in a pretty tight room, in order to give the desired results.

THE CHAIRMAN.—I was induced to ask Dr. Chapin to give you this item because of the very strong impression which I received in a talk with Dr. Kinyon, and the hope that this gas may serve in place of our present method of gaseous disinfection. There is one objection which Dr. Kinyon mentioned; and that was its extremely irritating effect, it being quite as bad, I think, as chlorine gas for those who use it.

Are there any further remarks to be made upon this paper? If not, we will pass at once to the paper on "The Best Systems of Garbage Disposal for Large and Small Municipalities," by Dr. Field.

THE BEST METHODS OF GARBAGE DISPOSAL FOR
LARGE AND SMALL CITIES.BY JAMES B. FIELD, M.D., CHAIRMAN OF THE LOWELL BOARD
OF HEALTH.

I regret that I cannot answer the question implied in the title of this paper, by informing you as to what is the best method of garbage disposal. To do so, it would be necessary to investigate the merits of thirteen or fourteen different garbage plants in nearly fifty different cities in this country, as well as to be posted upon the results obtained abroad. The difficulties of such an investigation would be enhanced by the fact that in many instances it is impossible to obtain accurate, unprejudiced figures as to the expense of disposing of the garbage.

I cannot speak with any degree of authority on the subject, except as regarding the system used in Lowell and the lessons we have learned from it.

Five years ago I had the honor of addressing this Association upon the same subject. There is not now such need as there was then of emphasizing the necessity of destroying garbage. We are all agreed that the swill and market refuse of a city should not be fed to swine or to cows. Indeed, the law of this State prevents us from feeding this material to cows. The act of 1889, introduced by the Lowell Board of Health, specifies that the garbage collected by a city or town shall not be fed to milch cows. The act of 1895 puts another restriction upon cities of over 30,000 population, by providing that the swill collected shall not be fed to any food animal except swine, thus extending the law in larger cities from milch cows to all cattle. What new dangerous characteristics garbage assumes when a city reaches 30,000 inhabitants can, I suppose, be only stated by our legislators.

We are deterred from feeding this material to hogs by fear of producing trichinosis, as was proved by Professor Mark's investigation. Even if the danger from this cause is exaggerated, the nuisance caused by a municipal piggery cannot be minimized, as the health authorities of Worcester and an adjoining town will tell us of the piggery maintained by the pauper department of Worcester.

Of all the methods of garbage disposal there is none that would result in such a saving for a city as to have each householder destroy his own table refuse. This would save not only the expense of disposal, but also the greater expense of collecting the garbage. For a long time such a plan has been advocated by the chairman of the Boston Board of Health. Some years ago there were a few stoves and ranges constructed with an

attachment at one side for the combustion of house offal. Nothing practical in this line had been done, until recently an invention, known as the Household Garbage Carbonizer, has been put on the market. In this appliance the garbage is inserted into the stove, is dried and carbonized, without interfering with the regular work of the stove. The next morning the charred residue may be used as a kindling for the morning fire. If the Household Carbonizer needed any recommendation beyond its own simplicity and merits, it might be stated that it is indorsed by two members of this Association, gentlemen who are chary even of recommending a good thing, and whose recommendation, when given, must carry considerable weight. I refer to the chairman of the Boston Board of Health and the agent of the Brookline Board. Furthermore, the Household Carbonizer is put upon the market by another member of this Association, well versed in the subject of garbage disposal, and not likely to advocate an article that did not possess intrinsic merit. An appliance like this, which would, in general use, do away with swill carts and the expense of collection and destruction of the offal, ought to receive our most serious consideration. Unfortunately, however, there are two or three obstacles to its general use. One is that in summer, when there is more garbage, small families often use the oil or gas stove. Another objection is that many people would not care to pay the small cost of a carbonizer as long as the city takes away the garbage free of charge. Still another trouble would come with part of our foreign population, too ignorant to use the simplest of appliances. For these reasons it will be necessary in most cities to supplement the use of the Household Carbonizer by some system of municipal disposal of swill, that will also dispose of the market refuse. We ought, however, to encourage the use of the Household Carbonizer as much as possible. In an ideal residential community such as we are now visiting [Brookline], where every householder has the best interests of the town at heart, the Household Carbonizer will meet with its greatest success.

Among the methods of municipal garbage disposal, the one that appeals to us at first thought is the utilization or reduction method, where the valuable constituents of the garbage are extracted and utilized. We cannot fail to be attracted to any method that thus produces something valuable from waste material. In this case, however, the cost of producing may exceed the value of the product.

One of the best known of these methods is the Merz process. Here the garbage is first steamed in tightly closed iron tanks, after which the water is squeezed out from the garbage in presses. Next it is dried in steam-jacketed iron cylinders. Finally, the material, now containing less than 8 per cent. of moisture, is treated with benzine or naphtha to extract the fat. The remaining tankage, containing a small amount of phosphoric acid and ammonia, is manufactured into fertilizer.

Six or seven years ago I recommended this process to the city of Lowell, having been led to believe that the revenue from the sale of grease and fertilizer would more than pay the cost of carrying on the process. In Buffalo the Merz people offered to treat the garbage for nothing, but before long they were so much out of pocket that the plant was abandoned. Finally, the city of Buffalo decided to pay a bonus for the destruction of its garbage; and so the Merz people improved their plant, and started up again. They now receive a bonus of \$35,000 a year. Their plant is located just outside the city line. In Milwaukee the Merz system is located fourteen miles north of the city, and a bonus of some \$24,000 is paid for the destruction of the garbage. In Detroit the Merz people have a plant twenty miles from the city, and collect and dispose of the garbage for \$63,000 a year. In St. Louis the Merz system is also used, their plant costing about \$280,000, and apparently giving satisfaction. This plant is in a sparsely settled part of the city. It treats about 180 tons of garbage a day, is supplied with an elaborate system of ventilation, and is the best reduction plant now in use. We have no data as to the cost to the city per ton of garbage destroyed by this process.

Another well-known reduction process about which we heard at our Lynn meeting three years ago is the Simonin. This was formerly in use in Providence; and our fellow-member, the Superintendent of Health of that city, can describe it to you much more satisfactorily than I can. The Providence plant was abandoned nearly a year and a half ago, because of the nuisance caused by naphtha and swill vapor escaping from leaky condensing pipes. In Cincinnati, or, rather, seven miles down the river, is a Simonin plant which destroys the garbage of that city. There is a contract for ten years, at an annual cost to the city of from \$15,000 to \$20,000. It is understood that here a trouble exists similar to that in the Providence plant. In New Orleans, however, the Simonin process, with improved condensers and other new appliances, is very satisfactory from a sanitary point of view.

Still another form of reduction apparatus is that which for a short time was in operation in Boston by the New England Construction Company. By this process the garbage is treated by steam under pressure, thus driving off the moisture and extracting the grease. The dried residue is ground up into fertilizer. This process was formerly in use in Washington, where most varied reports were given as to its success. Many complaints were made as to the unbearable nuisance caused by the plant in that city. It was alleged, however, that some of these complaints were started by a disappointed garbage collector, who formerly had the material to feed to his hogs. Be that as it may, the plant was burned down a few years ago, and never rebuilt. A similar process, known as the Arnold, has recently been put in use in Philadelphia, and is not free from objectionable odor. As to

the plant in Boston, we all know that its operations were considered by the courts to cause a nuisance, and that the plant had to be abandoned. The same company had been endeavoring to locate in Lowell a plant in which, if a long-term contract was assured, they would dispose of our garbage at twenty-five cents a ton,—a price far lower than any other method seemed to offer. A decision as to this proposition was deferred until the Boston plant was put in operation. Upon the condemnation of the plant there, we decided that whatever financial merits this process might possess, it certainly could not be located near any dwellings. Accordingly, the company made us a second proposition,—to convey the garbage in tightly closed boxes, by railroad, to Tewksbury, and there to dispose of it by their process, at seventy-five cents per ton. With the lowest figures from our cremator reaching eighty-one cents, it did not seem wise to sign a contract for a term of years at seventy-five cents. For this and other reasons the project was abandoned.

To illustrate the claims made by parties who have new systems of destroying garbage to sell, it will be necessary to mention a fourth kind of reduction apparatus. In this process, which shall be nameless, certain chemical agents are added to the garbage. The finished product is said to be rich in ammonia, phosphoric acid, potash, and grease. After deducting all expenses, there is a net profit of \$4 on each ton of green garbage. A plant for the treatment of thirty tons a day costs under \$23,000. If this amount is treated daily, the revenue in one year is over \$37,000,—an income of only 160 per cent. on the investment. With such a profit it seems rather strange that the company sells a plant outright instead of offering to treat the garbage for nothing. No city has yet adopted this plan, which by its own revenue would pay for the collection of garbage as well as its destruction.

While the agent of every garbage appliance is undoubtedly honest and thoroughly believes his own statements, we should nevertheless seek for corroborative evidence from unprejudiced sources.

In three or four other cities contracts have been signed for reduction plants, in some cases over a year and a half ago. There has, however, been considerable delay or trouble of one kind or another; for the buildings have yet to be erected.

It is understood that the officials having in charge the garbage disposal of New York City were, until recently, in favor of some reduction or utilization process. Colonel Waring, however, is reported as saying that the reduction processes are in such an unsettled condition, and improvements are so likely to be made, that at present he would not sign a contract for even as short a time as five years.

It will be noticed that in many instances these various reduction plants

are located several miles outside the city. This, of course, increases the expense of the haul, but is nevertheless advisable. Any rendering system, even with the best construction and with skilled supervision of its workings, is a nuisance, unless provided with efficient means of mechanical ventilation.

The initial cost of the common reduction systems renders them out of the question for small cities. Again, a system which has a large marketable product to dispose of opens up inducements for speculation; and, in the prospect of financial gain, the sanitary reasons for which the system was adopted may be overlooked. In any city where the health department is out of politics, the system employed should therefore be operated by this department rather than by a stock company.

The last form of garbage disposal to consider is its destruction by cremation. For several years garbage furnaces have been in use abroad; and within the last few years their use has rapidly increased in this country, especially in the South and West, until now fifty-five or fifty-six garbage furnaces are in use,—a striking contrast to the small number of reduction plants.

Thirty-five of these furnaces are the Engle furnaces, used in twenty-five different cities, among them being Des Moines, Ia.; Ogden, Utah; Butte City, Mont.; Findlay and Columbus, Ohio; Birmingham, Ala.; Jacksonville, Fla.; Tampa and St. Augustine, Fla.; Savannah, Ga.; Richmond and Norfolk, Va.; Panama, Coney Island, and Lowell. As it is with a furnace of this pattern that I am most familiar (that is, the Engle furnace at Lowell), I will speak of it more at length.

With the construction of this furnace many of you are already familiar. The swill teams, driving into a covered enclosure on top of the furnace, dump the garbage directly into a large garbage chamber with grate bars and linings of heavy fire clay. At each end of this garbage chamber is a fire-box. The flames from the fire nearest the stack pass over the garbage, igniting it and driving the smoke and gases across the second fire, where they are consumed. The flame from this second fire is drawn by a strong draught underneath the garbage grates, intensely heating the garbage from below. This flame passes out through the stack, with but little color and a scarcely perceptible odor. From doors on the side the garbage is frequently stoked, and from a lower set of doors the ashes are raked out.

The furnace in Lowell, known as an extra No. 4, was erected in the fall of 1892, at a cost of \$7,500. It is 42 feet long, 9½ feet wide, and 12½ feet high, outside measurement. The stack is 30 feet of brick and 60 feet of iron.

As the cost of burning was at first unsatisfactory, a temporary plant for burning by oil was introduced. This may have reduced the cost a trifle,

and undoubtedly would have more, had there been a permanent oil tank, so that oil could have been bought by the car instead of by the barrel. The only real complaint from using the cremator arose from the smell of the oil, due possibly to the temporary methods of its storage. There was also some danger to adjoining buildings from sparks, caused by the strong draft from the oil blower. The use of oil was finally abandoned, although in cities where oil is cheap it has been advantageously substituted for coal.

For the past three years we have kept accurate records of the weight of garbage cremated and the amount of coal necessary to consume it. Each week a statement is prepared, showing the amount of garbage consumed and the cost in coal and labor to effect its consumption. The health department of Lowell has no garbage furnaces to sell, and is not in league with the promoters of any system of garbage disposal. If other cities only gave as full and unbiassed figures as to the cost of treating their garbage, it would do much toward settling the vexed problem of what is the best system to use.

At Lowell in 1893 the most expensive week's burning was at the very high rate of \$2.75 per ton. This, however, was the first week in which a full account was kept. Excluding this, the most expensive burning for a full week was at the rate of \$1.94 a ton in 1893, \$1.53 in 1894, and \$1.31 in 1895. The least expensive week's burning in 1893 was at the rate of \$1.15 per ton, in 1894 \$1.02 per ton, and in 1895 81 cents per ton, thus reducing our lowest cost of combustion 34 cents a ton in two years.

To take, however, the least expensive week may not seem a fair comparison. The period from April 1 to October 1 can be compared for each year. For these six months in 1893 the average cost for fuel and labor for burning a ton of garbage was \$1.57, in 1894 \$1.17, and in 1895 99 cents,—a reduction of 56 cents in two years. About the middle of last July a change of firemen was made at the Lowell cremator. For the eleven weeks succeeding this change the cost of burning garbage has not averaged over 84 cents per ton.

Below is an itemized account of the least expensive week, August 26 to 31 inclusive, 1895:—

<i>Material burned.</i>	<i>Expense.</i>
Swill 167,742 lbs.	8 tons soft coal at \$4.30 . . . \$34.40
Market refuse 31,430 lbs.	4 tons nut coal at \$4.65 . . . 18.60
9 mattresses	1 man 7 days at \$2.25 . . . 15.75
5 dogs	1 man 6 days at \$2.00 . . . 12.00
6 cats	
8 bundles of rags	
	100 tons at \$0.81 per ton.
	<u>\$80.75</u>

As a rule, the larger the amount of swill, the cheaper the cost per ton. With improved methods of firing and more systematic stoking of the garbage, we have steadily reduced the cost of combustion. Probably the cost will eventually go somewhat lower, but there will not be any large decrease.

The ashes resulting from the combustion of Lowell garbage have frequently been analyzed at the State Agricultural College and elsewhere. The analyses vary greatly, according to whether the ashes are kept under cover, free from moisture, or whether they are exposed to rain. There is also a difference between screened ashes and coarse ashes containing larger pieces of bone. To a certain extent summer ashes appear to be poorer than those of the spring or fall.

The largest amount of potassium oxide per 100 parts contained in a specimen of the ashes was 8.83. The largest amount of phosphoric acid was 32.36. In average specimens of ashes kept under cover there should be about 5 per cent. of potassium oxide and 16 per cent. of phosphoric acid. The phosphoric acid is in combination, mostly with lime.

Judging by the price paid for Canada wood ashes and material of a similar nature, the swill ashes ought to sell for from \$8 to \$10 a ton. At least 5 per cent. of the garbage comes out as ash, and this therefore would reduce the cost of combustion about 40 cents a ton. Fertilizer manufacturers, however, seem loath to experiment with new materials, and as yet we have sold only about 60 tons of ashes. We hope eventually to obtain a steady market for the ashes, but at present a revenue from this source should not be relied on.

When we say that it has never cost us under 80 cents a ton to burn our garbage, we do not mean that that is the lowest price at which we could burn garbage. With larger amounts of garbage, more perfect methods of drainage, and a wider furnace, exposing more area to the flames, there would be a much lessened expense of combustion.

Lowell has to pay high wages for labor, and more for fuel than almost any other Massachusetts city. Whether coal is brought by all rail or partly by water, the freight rates are high. Seaboard cities or those situated nearer the coal mines will make a better showing than does Lowell. In other cities using the Engle cremator, the cost of operating is much less than with us. Especially good results are obtained in the South, where fuel and labor are cheap. In Savannah, where pine wood is used as a fuel, a sworn statement of the cost of fuel and labor for four summer months gives a rate of 12.3 cents per cubic yard. If a cubic yard of swill weighs two-thirds of a ton, as it does in this locality, this would give the cost as 18.5 cents a ton. If our Lowell furnace could obtain similar fuel and labor, the cost would approach these figures.

The fact that there are in this country more Engle furnaces in use than all other kinds combined would seem to show that this is the best furnace. Whether this view is correct or not has not been determined. The sole reason for giving the Engle furnace prominence in this paper is because I am better acquainted with its workings. Theoretically there is no reason why other and newer types of furnace should not be an improvement upon the Engle. The utilization of heat that now goes up the chimney, for drying garbage before its cremation, and the exposing of a greater area of garbage to the flame ought to reduce the cost. Doubtless other furnaces may run more economically than the Engle, but there is no satisfactory proof that they do. They all fight shy of figures such as are given in Lowell. A furnace manufacturer's statement of a week's run with selected garbage is a very different thing from the statement issued by a Board of Health, giving every week's run, good and bad.

The Brown furnace is somewhat like the Engle in construction, except that the secondary fire is absent. The furnace is surrounded by a water jacket, and has iron grate bars of inverted V shape. Their furnace at Wilmington, Del., has done excellent work. A spray of oil is used as a fuel. I believe the expense is less than with our furnace at Lowell; but, as no such detailed statements are obtainable there, positive figures cannot be given. From statements made by the Wilmington Board of Health to the Newton (Mass.) Board of Health, an engineer and a laborer can destroy about twenty-seven tons of garbage daily by the use of 240 gallons of oil and $\frac{1}{4}$ ton of coal. This would mean about 53 cents per ton in Lowell. Over twice as much garbage is destroyed in Wilmington as in Lowell, which would also make a difference in the cost of destroying it. Moreover, the Brown furnace costs more to build than does an Engle furnace. There is also a Brown furnace at Troy, N.Y.

The Rider Garbage Furnace has been in operation in Pittsburg and in Allegheny City for six or seven years. The health authorities of those cities speak most enthusiastically of this furnace. It is a solid-hearth furnace, with two connecting dome-shaped chambers, into the top of which garbage is introduced, forming a cone-shaped pile, thus exposing great area of surface to the heat of the furnace, which is reflected downward from the dome-like top. The expense is estimated to be under 25 cents per ton; but these are manufacturer's figures, and no detailed report of the work of a furnace for a long period is given. Natural gas is used at Pittsburg, and slack coal at Allegheny. The cost of fuel would be much higher in New England, but an exact comparison is impossible.

The Dixon furnace uses three fires, one above and one beneath the garbage grates, and a third fire of coke situated in the flues, so as to consume all vapors which may arise from the burning garbage. This furnace

is in use at Atlanta, Ga., Salt Lake City, Camden, N.J., and at McKeesport, Pa. One is also being constructed at Fort Wayne, Ind. The report of the health officer of Washington, D.C., on the Atlanta furnace, commends it from a sanitary point of view, but spoke of the liability of trouble in other cities from the free water, which in Atlanta is soaked up by the dry rubbish collected with the swill. The McKeesport furnace was erected last year at a cost of a little over \$8,000. It consumes night soil as well as refuse. Coal dust is used as a fuel. The furnace is reported as highly satisfactory both from a sanitary and economic point of view; but no reliable estimate as to the cost of operating can be made, as the material destroyed is not weighed, but is measured as one-horse loads, two-horse loads, barrels, and tanks.

The M. V. Smith Garbage Crematory, by means of Siemens's regenerators of checker-work fire-brick, stores up the heat that would otherwise go up the chimney. By a reversal of drafts the heat warms the fresh air that is used to support combustion. In each furnace there are two combustion chambers, so that the garbage burning in one chamber furnishes the heat to dry the greener garbage in the other chamber. When the garbage in the first chamber is fully incinerated, fresh garbage is supplied to it, and the current of fire is reversed. The hearth is solid, so that the garbage burns only on top. The plant is elaborate and expensive, combining, if necessary, several furnaces in one crematory. The furnaces at Wheeling, W. Va., and Muncie, Ind., use natural gas as a fuel, and destroy night soil as well as garbage. The furnaces at Atlantic City, N.J., and at Philadelphia, have to generate their own gas for fuel. The only complaint made against this furnace by the Washington authorities is that of water leaking from the lower doors. I have no data as to the cost of operating the Smith furnace.

The Mackay furnace at Yonkers, N.Y., is like the Engle in having a fire at each end. Its distinctive feature is two garbage grates, one above the other. The garbage, after a partial drying on the upper grate, passes through the revolving grate bars to the lower grate, where its combustion is completed.

The Vivartus furnace at Philadelphia and at Scranton, Pa., provides for the drying of garbage before its combustion by placing it in separate chambers, from which it slowly passes to the combustion chamber. The Newton board's report condemns the Philadelphia furnace of this pattern as causing a very offensive odor, and not completely burning the garbage.

The Thackeray incinerator at Montreal is patterned after the English type of destructors. There are several pairs of large furnaces or cells, between which are smaller and more intensely heated cells for the combustion of more refractory materials. As with many other furnaces, there is a

fume cremator in the chimney. The waste heat is utilized by a boiler placed in the stack. The steam from this boiler runs a fan for forcing heated air through the cells. While the expense of operating this furnace is very low for large amounts of garbage, yet no analyzed details as to exact cost of labor and fuel are at hand. The Newton Massachusetts Board of Health has recently recommended the purchase of a Thackeray incinerator for \$17,000, and intends to use it for the destruction of night soil as well as garbage and other municipal wastes.

The Brownlee furnace, in operation at Gainesville, Tex., at Terre Haute, Ind., and at New Brighton, Staten Island, is not unlike the Dixon furnace in principle. There is also a Johnson furnace at Chicago, and an oil burning furnace at Los Angeles. As yet there are not sufficient data to show that the newer furnaces have made much improvement over the older examples of the Engle and Brown furnaces.

The only way to obtain a satisfactory solution of the problem as how best to dispose of our swill is to make a thorough personal investigation of all the methods now in use.

Such an investigation, you will be glad to know, has been begun by Francis C. Green, of New York. Mr. Green has visited different cities, armed with an exhaustive set of questions concerning the collection and disposal of all waste materials. He is endeavoring to obtain information at first hand, and is supplementing it by personal inspection of the various systems. This investigation is under the direction of Mr. Rudolph Hering, the well-known civil engineer. Mr. Hering is chairman of the committee on disposal of garbage of the American Public Health Association. When his final report is made, it will be a most valuable and authoritative communication.

In the mean time the few conclusions that I can draw from limited personal observation and inquiry are as follows: That reduction systems, even if well located, properly constructed, and properly managed, can at present offer no marked improvement over crematories.

That at present cremation is the best solution of the problem for the average New England city.

That the kind of cremator to be selected should have been in active operation for at least a year in some city where it has caused no nuisance.

That trustworthy figures should be obtained as to the average cost in fuel and labor to burn a ton of garbage, and that the price of fuel and labor should be known.

That that crematory should be selected which, considering the original cost, will do the city's work most efficiently and economically.

That it should be owned and operated by the city.

That the cremator now in use in Lowell is a vast improvement over the methods employed in all other New England cities.

THE CHAIRMAN.—I will call upon Dr. Theobald Smith for some remarks upon this paper.

REMARKS OF DR. THEOBALD SMITH.

Mr. President and Members of the Association.—Most of our efforts in sanitation are directed to cities and large centres of population; and it seems to me that comparatively little is done for the smaller and poorer communities of the country, because the great pressure comes from the large cities and leaves the sanitarian little time to devote to strictly rural problems. Some time ago, in talking with Secretary Morton of the Department of Agriculture, I suggested to him that his department would be a good place for a division of rural hygiene, which could give its whole attention to the publication of educational literature having for its object the elevation of the sanitary condition of the country districts.

When I accepted the invitation to speak, I realized that I had nothing practical to say on the subject; but it seemed to me after a little reflection that it might be worth while to say something concerning the relation of garbage in the smaller towns and villages to animal diseases, especially as the garbage is still used extensively as food for animals. Of course, I am leaving aside entirely the question as to its food value, which is something for agriculturists to consider; but it seems to me that it might be worth while to consider how far garbage is actually dangerous as found in country villages and wherein the danger lies.

Our boards of health have in charge the control of infectious animal diseases, and, if they can show to our rural population that the garbage is to a certain degree dangerous to animal life, it will be much less difficult to convince them of its possible dangers to human health. In regard to the dangers of garbage from private households, there is, of course, the possibility of poisonous substances being thrown into the garbage, and afterward fed to animals, with serious results. Pointed metallic bodies may be carelessly thrown into it. I recall in this connection a herd of cattle in the District of Columbia which were examined by the Agricultural Department for tuberculosis. There were thirteen, I think, in this herd; and I made the autopsies myself, studying then tuberculosis almost exclusively, and I found in eleven extensive lesions between the second stomach and the liver, due to pointed bodies which these animals had swallowed. Not only had they produced local inflammations and abscesses, but they had in a few cases caused abscesses in the lungs and extensive pleuritis. Inquiry was made; and it was found that these animals had access to rubbish heaps, which, I think, may come under the designation of garbage in this discussion. Most of these pointed objects were hair-pins,

and this was explained by the fact that it was a girls' school from which the rubbish was collected.

This is only an instance of the possible dangers of garbage in an incidental way. The greatest dangers lie elsewhere. Garbage is collected from the larger centres of population; and the more varied and extensive the collection, of course, the more likely it is that disease germs are present which are dangerous to animal life. This will perhaps apply more to swine than to other domestic animals. I do not know what the conditions are in this State in that respect; but it is a fact that a great many outbreaks of swine disease, the loss of which bears heavily upon the farmer, are due to the swine being fed upon the swill of hotels and cities near by. I may be permitted to recall an extensive outbreak in New Jersey, where the swill from the hotels of Atlantic City was fed to swine. In making autopsies of these cases, I found it very interesting to note the great variety of lesions which these animals exhibited,—lesions which could not be classed under any one disease, but which belonged to several diseases. A number of disease germs had been brought together in the garbage fed to this herd, and transferred from one animal to another by direct infection. This was proven by the isolation of three distinct disease germs from this herd.

Much has been said concerning the danger of fermenting and decomposing garbage. Garbage in this condition contains a large number of bacteria, but they are not necessarily specific disease germs. I think the dangers arising from offal in this condition overestimated. Thus we have in milk an immense number of bacteria which are introduced into butter and cheese. But they are with rare exceptions harmless species. The same may be said in regard to garbage. As a matter of fact, the multiplication of saprophytic bacteria may check the multiplication of the dangerous species accidentally present.

E. Klein, of London, maintained recently that diphtheria bacilli injected into cows appeared in the milk. If this were true, swill feeding might prove dangerous by introducing into the body of the cow disease germs which would be excreted by the udder. Klein's results have been discredited by Abbott, and I think it is safe to assume that bacteria are not thus easily introduced into milk through the system of the cow.

Another danger from feeding offal is the dissemination of trichinosis among swine. Professor Mark, in the annual report of the Massachusetts State Board of Health for 1888, in commenting upon the high percentage of trichinosed swine among those raised upon city offal in the environment of Boston, makes it appear highly probable that the offal is largely responsible for the extent of this affection. This offal, according to his view, probably contains scraps of uncooked trichinous pork, and of bones to which some of the flesh is still attached.

The main source of trichinosis in the West seem to be the small slaughter-houses in the country districts, in which animals not fit to be sent to Chicago are slaughtered. Here herds of swine are fatted on the offal. There is probably the same condition obtaining in parts of New England. If there is anything valuable in the offal from such slaughter-houses,—and it is undoubtedly nourishing, judging from the growth of the swine that feed upon it,—the boards of health should recommend that it be cooked or brought up to the boiling point; for this would destroy all danger, not only that arising from the presence of animal parasites, but of bacteria as well.

A possible source of danger in times of cholera epidemics is the dissemination of the specific disease germs by flies. These pests are known to void, in a living condition, cholera spirilla consumed twenty-four hours before. Garbage may at such times aid in the distribution of the disease by favoring the multiplication of flies, and, if it contain the disease germs accidentally, may become itself a focus of infection.

To recapitulate briefly, I would state that the larger the territory from which garbage comes, and the larger the herd of swine to which it is fed, the more frequent the opportunity for infectious diseases to appear in the herd. If this be true, the smaller the area from which garbage comes, if not actually infected, the less likelihood of an outbreak of disease. To be sure, it would be safe for any health officer to hold that garbage can be fed after it has been brought up to the temperature of 160° Fahrenheit for at least thirty minutes, which temperature destroys nearly all disease germs. Whether this is desirable or profitable, somebody who has more practical knowledge of animal feeding than I will have to decide.

THE CHAIRMAN.—I should like to hear from Mr. James C. Coffey, of Worcester, in regard to his experience in that city.

REMARKS OF JAMES C. COFFEY, ESQ.

Mr. President,—At this late hour it is unnecessary to take up a great deal of time, because the subject has been covered so well by Dr. Field's paper, and by the other gentlemen who have spoken to the subject. However, perhaps it might be of interest to give my impressions of the matter.

Two years ago, at the request of the City Council of Worcester, I investigated the subject of garbage disposal, visiting a number of cities. I saw all of the systems then in operation, and on my return made a full report to the City Council. Since then some plans have been patented and put upon the market which I have not seen, so that I am not competent to speak of those.

I have a decided opinion that for small cities and towns the cremation system is best. It is the best because it is the least expensive. A city or town may own and control it. As a natural consequence, it is more sanitary than the reduction systems which are on the market. I returned from my trip convinced that the American reduction plants were not sanitary and were expensive, notwithstanding the fact that their promoters were ready to whisper in my ear that a profit of 35 or 40 per cent. was realized on the investment. They were not ready to construct the plant, however, unless they had a contract of from twenty to thirty years, with a large bonus. I never could understand why it was, if the percentage of profits was so large, they were not competing with each other to obtain the garbage from the city, paying for the same.

Dr. Smith is evidently not acquainted with the methods of garbage disposal in Massachusetts. As a matter of fact, the swill is fed almost entirely to swine. The only plant for garbage disposal in the State of Massachusetts is located in Lowell. All the rest of it, except what Boston and Lynn send out to sea, to be returned by the tide, on the beaches, is fed generally to swine.

In Worcester we have 100,000 people in round numbers; and the garbage of the city is fed entirely to swine, which never eat anything else from the time of weaning until they are sent to the slaughter-house.

This year, at the annual inspection of the city farm, an announcement was made that the sale of pork would come within \$700 of the entire cost of the collecting and disposing of the garbage for the year. It is needless to say that the Board of Health is on record against this method of disposal because it is not sanitary. It is not surprising, however, that progress is slow in this direction; for a great many systems have failed upon trial, and the authorities have been made cautious in consequence. My own impression is, after seeing the various systems, that the Brown is the best furnace in the market. I saw this furnace in operation in Wilmington, Del., last year. It was during a hot spell in August. I spent about three hours in the building; and the garbage was consumed without reasonable grounds for complaint at a cost, I was told, of about 29 cents per ton. It would cost more here, as labor and coal or oil are dearer here than there. The Brown people at that time offered to sell the city of Worcester a furnace, and guarantee that the cost of consumption would not exceed 45 cents per ton.

The Engle system is, in my judgment, fully as sanitary as the Brown, but more expensive. I saw the Engle in operation at Lowell, at Coney Island, and at the World's Fair; and there is no question about it doing the work satisfactorily and in a sanitary way. It is simply a question of cost.

The reduction process, if at all suitable, is only so for large cities, be-

cause of its ability to dispose of garbage in large quantities. This is where the reduction has an advantage over the burning process, the capacity of the average furnace being only about fifty tons daily. This would necessitate in a large city like New York, which produces about 800 tons of garbage daily, the erection and maintenance of 16 furnaces. The cost of land and the crowded conditions of the buildings might militate against the furnace, and render a reduction plant necessary. Otherwise, it is my opinion that the cremation system is best for towns and cities, the only exception, if any, being the very large cities.

THE CHAIRMAN.—I will call upon Mr. W. F. Morse to say a few words on this subject of garbage disposal.

REMARKS OF W. F. MORSE, ESQ.

Mr. Chairman,—The paper read by Dr. Field covers the whole situation as regards the present methods in use for garbage disposal so completely that I can add nothing to it. The point of the whole question seems to be just here. None of the methods under trial seem to have been fully demonstrated or absolutely and entirely satisfactorily.

Where the systems of reduction and methods of cremation are employed, each have their advocates; but it does not appear that either one or the other has perfectly solved the question. Both methods are going on; and, when they get to the point of efficiency and economy, then municipalities will be prepared to decide which one they prefer.

But what I wanted to say was that, if the garbage can be disposed of in the household without offence and at no extra cost, it would save an enormous sum of money to the cities as well as discomfort and annoyance to the householder.

The question is, Can it be done? We know that it can be done by burning in the range or stove, but we know also that, if we do this, we shall have the nuisance of an offensive discharge from the chimney, and in the end the destruction of the range or stove fittings.

How, then, can it be disposed of in the household without these results?

Three years ago the presiding officer of this meeting said to me: "You are going in the wrong direction in advocating public disposal of waste. Each householder should be in a position to destroy his own waste without extra fuel, and with no nuisance resulting." I replied: "There have been some attempts to do this; but, so far as my investigation shows, these have been failures. At present we cannot accomplish this if we tried."

The matter rested until a year ago, when he suggested an idea which has

now been carried into practical operation, resulting in an improved system of domestic disposal, by first drying or carbonizing the garbage and then burning it, which seems to be entirely reasonable and economical.

If you take fresh kitchen swill, remove it a few feet from the fire-box of the stove or range, and apply a moderate, continuous heat which will not disengage the gases, but will drive off the water, the residuum after this evaporation has been accomplished is a charcoal which will burn readily and quickly in the fire-box, giving a clear, bright flame, supplying in some degree the place of fuel.

If at some point in the stove-pipe before it enters the chimney flue, there is fixed a receptacle around and through which the heat can pass without interference with the draft, and the garbage is placed in this receptacle in such a way as to allow the direct contact of the heat with the material to be dried, the process of evaporation can be carried on without offence, with a minimum amount of trouble, and can be made continuous during the time the heat is in the stove or range.

I have seen this done. I believe this to be a step in advance of real and practical value, both to the municipality and the citizen; and it seems to be an addition of a new system or method of garbage disposal, which ought to be considered whenever this question comes up for examination.

True, there are some difficulties in the way. It may not be possible to apply it to every form of stove or range, especially where gas is in use for fuel; and, in cases where the kitchen apparatus is enclosed in brick, it is somewhat difficult to make proper attachment.

The experimental driers heretofore in use are susceptible of being greatly improved. If there be no serious objection from a sanitary point of view (and this seems to be assured by the evidence of hundreds now in use), and the difficulties encountered can be overcome by the adoption of improved apparatus, the underlying principle of garbage disposal by the surplus heat of the kitchen stove, on the premises, without offence, and with reasonable speed, has certainly been demonstrated as being entirely practicable, a great saving over the public methods of reduction or cremation as at present practised, and is entitled to be taken into account whenever and wherever this matter of garbage disposal is under consideration.

THE CHAIRMAN.—Are there any further remarks to be made? The question is open for general discussion.

DR. F. H. OSGOOD.—Mr. Chairman, in regard to the feeding of garbage to swine: in all the infectious swine diseases that are reported, ninety cases out of a hundred can be traced directly to the feeding of city swill. Of course, where farmers feed their own swill or swill collected in their immediate neighborhood, such a result would rarely occur.

When the Commission are notified of an outbreak of infectious swine diseases, we can almost always trace it to the feeding of swill collected over a large area, and in which are almost always to be found the trimmings of Western pork.

THE CHAIRMAN.—Will Dr. Smith favor us with a few remarks?

DR. THEOBALD SMITH.—I think it safe to say that hog cholera may mean half a dozen different affections caused by several different disease germs, by parasites and by toxic products. The city garbage may, in short, be considered a kind of distributing centre of these diseases. It may receive infectious material from any part of the entire country, and distribute it again to its immediate neighborhood.

THE CHAIRMAN.—I understand that Mr. Brimblecom, of Newton, is present. If so, we would like to have him tell us what is being done with garbage in Newton.

REMARKS OF J. C. BRIMBLECOM, ESQ.

Mr. Chairman and Gentlemen.—Our board has considered this question carefully, and has come to the conclusion that the reduction system is not applicable to our city, and that cremation is the only process which we can recommend.

We are very peculiarly situated, as you all know. As Colonel Higginson has well said, "We are a city upon a circumference," and composed of a number of scattered villages. Consequently, the cost of carting the garbage and other waste is large. We also have a new system of sewers, and many streets not yet sewered, where privies and cesspools are still used, and where considerable trouble is anticipated unless we can dispose of their contents in a more sanitary manner than at present. Our ash-teams collect all sorts of rubbish, which is dumped at various convenient places, and causes considerable nuisance. Our board early came to the conclusion that they must get some system which would dispose of all kinds of rubbish and night soil as well as garbage, and we tried everywhere to obtain such a system. Last winter we came very near recommending the Brown furnace for disposing of everything except ashes. The Brown system is a very good one, indeed, for garbage; and not until the meeting of the American Public Health Association in Montreal, in 1894, did we get any clew where to go for a better. The published reports of that meeting gave us some idea of what they were doing in Montreal and I entered into correspondence with the local authorities, and received replies of such a character that the board went up there last summer.

We arrived at nine in the evening, and at nine the next morning were at the incinerator without the knowledge of any one connected with the plant.

The Thackeray incinerator is so arranged that the waste (which includes ashes, rubbish, and garbage) can be placed immediately into the hoppers, from which it slowly passes into the cells, of which there are 12, each being 6 by 13 feet in size.

As the collection of about 150 tons of waste per day is all made during the night, the accumulations are dumped on one side and fed into the hoppers as required. At the time of our visit, the cells were in the various stages of burning; and the men in charge kindly showed us all the details of the furnace. There was absolutely no odor about the premises; and no fuel is or ever has been used, with the exception that the staves of the cement barrels left over from the construction, in the fall of 1894, were used to start the first fires. The waste lying on the upper part of the grate and in the hoppers is exposed to the heat from the fires in the front of the cells, and thus becomes dried, and becomes fuel to dry that which follows. The only expense connected with the plant is that of the labor necessary to keep the fires in good condition.

The clinkers from the furnace have been used, in part, by the street department of Montreal in road building. This plant does not dispose of night soil, as a separate contract requires it to be burned; and another plant in the outskirts of the city cares for it in a similar manner as the one described. All the waste of a district of 68,000 people is disposed of by the Thackeray incinerator, without offence and at a nominal expense.

Our board has recommended the erection of a Thackeray incinerator in Newton, containing 6 cells, with a stack 150 feet in height, and a capacity of 65 tons of waste and 5 barrels of night soil per twenty-four hours. A steam-boiler will be located in one of the flues, from which enough steam can be generated to work a fan to increase the draft on such days when the weather conditions are bad for the furnace. Such a fan is connected with the Montreal plant, but has never been used. We hope to use the steam generated in our plant for a steam disinfector, when the amount of power has been determined.

This class of incinerators has been in use in England for many years, and we have received full reports of the workings of a similar furnace in a city of 25,000 inhabitants just outside of London.

A small book on Refuse Destructors, by Charles Jones, published in England, gives descriptions of the various systems used in that country, with full details of cost, etc. A report upon the amount of power to be obtained from the incineration of municipal waste, and the utilization of it, is very interesting reading.

I am informed that Mr. Thackeray is now engaged upon plans for another plant for Montreal, in which he alternates boilers with the cells, and intends to develop about 1,500 horse power, to be used in lighting the city with electricity.

You can see the possibilities of this system of incineration, which will also take care of all our municipal waste in a most satisfactory manner.

The discussion being closed, the Secretary, Dr. Farnham, said: Mr. Chairman, I should like to move before we adjourn that the hearty thanks of the Massachusetts Association of Boards of Health be tendered to the town of Brookline for the generous entertainment which they have provided for the Association this afternoon.

The motion was seconded, and adopted unanimously by a rising vote. There being no further business to come before the Association, the meeting was adjourned.

DR. JULIUS FEHR'S

"COMPOUND TALCUM"

"BABY POWDER."



THE

"Hygienic Dermal Powder"

FOR

INFANTS AND ADULTS.

Originally investigated and its therapeutic properties discovered in the year 1868 by Dr. Fehr, and

Introduced to the Medical and Pharmaceutical profession by Dr. Fehr, in the year 1873.

COMPOSITION.

Silicate of Magnesia with Carbolic and Salicylic Acids.

PROPERTIES.

Antiseptic, Antizymotic, and Disinfectant.

USEFUL AS A GENERAL SPRINKLING POWDER,

With positive Hygienic, Prophylactic, and Therapeutic Properties.

GOOD IN ALL AFFECTIONS OF THE SKIN.

Sold by the Drug Trade Generally.

Per Box, Plain	\$0.25
Per Dozen	1.75
Per Box, Perfumed50
Per Dozen "	3.50

THE MANUFACTURER,

JULIUS FEHR, M.D.,

Ancient Pharmacist,

Hoboken, N.J.,

Only advertised in Medical and Pharmaceutical prints.

JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

January Quarterly Meeting
1896

SUBJECTS: Certificates of Death; Culture Diagnosis of Diphtheria; The New Public Bath in Brookline (illustrated); Authority of Local Boards of Health.

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are two dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

P.O. Box 2510, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. VI.

January, 1896.

No. 1

JANUARY QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

NOTE.—It will be observed that the present issue of the *Journal* contains several items of sanitary news in addition to the usual report of the Association. It is hoped in time to print each quarter a careful *résumé* of everything which occurs throughout the State of interest to sanitarians; and sanitary officers everywhere are cordially invited to send to the editor, in care of Maynard & Small, P.O. Box 2510, Boston, any material of general interest which may come to their notice. All such information will be gratefully acknowledged, and, if available, used in the *Journal*.

The January quarterly (or annual Boston) meeting of the Massachusetts Association of Boards of Health was held at the Parker House, Boston, on the afternoon of Thursday, Jan. 23, 1896. In the absence of the President, H. P. Walcott, M.D., the Vice-President, S. H. Durgin, M.D., presided. The meeting was called to order shortly before three o'clock, and the Chairman called upon the Secretary to read the records of the last meeting. The records were then read, and declared approved, no corrections being offered.

THE CHAIRMAN.—The next business will be the report of the Executive Committee, which will be read by the Secretary.

THE SECRETARY.—The Executive Committee recommends for membership the following-named gentlemen:—

- A. D. HOLMES, M.D., Hyde Park.
- J. C. LINCOLN, M.D., Hyde Park.
- EDWIN C. FARWELL, Hyde Park.
- Prof. H. C. ERNST, M.D., Jamaica Plain.
- THEOBALD SMITH, M.D., Jamaica Plain.
- JOSEPH S. BIGELOW, Cohasset.

It was moved and seconded that the gentlemen whose names had been read should be elected members of the Association. The motion was carried.

THE CHAIRMAN.—The next business will be the reading of the Treasurer's report.

The Treasurer's report was then read and accepted. It is as follows :—

ANNUAL REPORT OF TREASURER FOR 1895.

Receipts.

Balance from 1894	\$390.66
Received from annual assessments	336 00
	<u>\$726.66</u>

Expenditures.

Stenographic report of meetings	\$101.65
Postage	34.97
Printing	31.65
Typewriting and stationery	6.55
Extra dinner and cigars	5.70
Total expenses	<u>\$180.52</u>
Balance to 1896	546.14
	<u>\$726.66</u>

Respectfully submitted,

JAMES B. FIELD, *Treasurer.*

Examined and approved as correctly cast and properly vouched for.

JAMES C. COFFEY, *Auditor.*

JAN. 23, 1896.

THE CHAIRMAN.—The next business in order is the election of officers for the ensuing year. How shall this be done?

THE SECRETARY.—I move that a committee of three be appointed by the Chairman to present a ticket to the Association.

The motion was carried, and the chair appointed Messrs. Coffey, Pillsbury, and Newhall.

MR. GEORGE F. BABBITT.—Mr. Chairman, I do not know what this Association is going to do with the enormous surplus they have; and some of us have thought that a large surplus is a menace and danger to any organization. I know there was a motion presented at the last meeting, and I

think adopted, that for the coming year the assessment be reduced to \$2. I do not know why it should not be reduced to \$1. I say this to bring it before the Association. I am not particularly anxious about it; but such an assessment would be ample to carry on the business of the Association, as I understand.

THE CHAIRMAN.—It would be in order to give notice that such an amendment to the by-laws would be presented at the next meeting. It has to go over to another meeting.

MR. BABBITT.—Well, then, I do that; but it is in order for discussion, I suppose, if anybody wants to discuss it.

THE CHAIRMAN.—No. I think it has to be discussed at the next meeting, but a written notice now would be in order for the next meeting.

The committee appointed to present a list of officers for the ensuing year then returned; and Mr. James C. Coffey, of Worcester, presented the report of the committee, as follows:—

MR. COFFEY.—The committee have attended to the business committed to them, and are ready to report. I must say that we are fortunate this year, as we always have been since the organization was founded, in not having any candidates for the offices. Consequently, the committee brought in the old list of officers just as they were last year, with the exception of Mr. Babbitt, who declines to serve on the Executive Committee; and we have substituted Mr. William H. Gove, of Salem, in his stead, so that the report of the committee is as follows:—

President.

HENRY P. WALCOTT, M.D.

Vice-Presidents.

S. H. DURGIN, M.D.

S. W. ABBOTT, M.D.

Secretary.

EDWIN FARNHAM, M.D.

Treasurer.

JAMES B. FIELD, M.D.

Executive Committee.

W. P. BOWERS, M.D.

G. L. TOBEY, M.D.

NATHANIEL HATHAWAY.

W. H. GOVE.

W. Y. FOX, M.D.

I move that that list be accepted and elected, and that the Secretary cast the ballot of the Association to that effect.

The motion was seconded and carried.

THE CHAIRMAN.—It is a pleasure to me to take it upon myself to thank the Association for the entire list. [Laughter.] The next business before the meeting is of a miscellaneous character. If any one has a motion to make, it is now in order.

DR. S. W. ABBOTT.—Mr. Chairman, I would like to say a word or two in regard to the publications of the Association. They have now completed the fifth year of these publications, and I understand they are becoming somewhat popular outside the State. There are some taken outside, and probably the number will increase. Their value is increasing as they grow older, and I think it is desirable to make these publications as good as they can be. I want to say there are in the series, if you wish to bind them, some five volumes now. There are two defects in the series. The first number of the second volume never was issued, and the third number of the third volume. So, if you desire to get those numbers, I think it is doubtful whether you can. I never have been able to find any. I do not think they could have been published. The old publishers have left the State, and it is impossible to obtain any knowledge of them; but otherwise the series would be complete. And, in order to make this publication still better, I thought I would make this motion, "That the Publication Committee of this Association be authorized to print from time to time in the quarterly transactions of the Association any items of information which said committee may deem useful to the local boards of health in Massachusetts, in addition to the regular business transacted at the meetings of the Association." I do this for the reason that sometimes during the three months between the meetings there are things that come up that might be somewhat useful. Here is a pamphlet, for instance, that was published only a few days ago, with some things in it which might be preserved in our records, and would be useful to certain boards of health. For instance, there are at least twenty-five public institutions in the State of Massachusetts. There are post-offices in every town. There are custom-houses and light-houses on our coast. And there is a question as to what authority local boards of health have over the government of such institutions. There was a question which came up in the town of Concord not long ago, where the board of health of the town of Concord submitted this question to the attorney-general, having reference to the State prison, whether the board of health of the town has authority over it. Now, this question is liable to come up anywhere,—for instance, in the new hospital to be erected in Rhode Island, or in insane asylums or the State prison, or a dozen other such places; and I think this pamphlet has some things in it which would be desirable to have published in our own *Journal*. I think anything of that sort that might come up during the year would be desirable for the Publication Committee to publish.

MR. EDMUND M. PARKER.—Mr. Chairman, I wish to second the motion which Dr. Abbott has just made, and, in seconding it, to say the subject to which he has referred is one that has often come before us in the local board of Cambridge. We appreciate the value which has already been given the publications of this Association, and which may be given to future publications; and, in saying that, I have no doubt I voice the sentiment of those present. We shall be very glad to see those publications take a wider range and have a still greater usefulness than they possess at present; and perhaps in such publications may be found a remedy for the evils which have been already referred to of the enormous surplus, which I should be happy to see reduced by such a publication. I second the motion of Dr. Abbott.

THE CHAIRMAN.—I would say that it will not cost the Association one dollar more for this extra publication, and that it will be a comfort to the printer to have this material brought for insertion in the report. It is moved and seconded that the Committee on Publication be authorized to print from time to time interesting matters which may affect the interests of the boards of health of the State in the quarterly *Journal*. Those in favor of the motion will say aye.

The motion was carried.

THE CHAIRMAN.—I would give an invitation to any and all members of the Association to send such items to the Committee on Printing, and they will receive early notice. As I understand this vote, it is to be left in the discretion of the Committee on Publication as to whether any particular item shall be printed or not. Is that the intent of this motion? There should be some guard of this sort, otherwise the committee will be flooded with a great variety of things which it might or might not desire to insert in the *Journal*.

MR. PARKER.—Mr. Chairman, there is another matter to which I would like to refer, under the head of miscellaneous business, if the present one has received all the discussion desirable. I desire to make this motion, if it is proper for me, that the Legal Committee be requested to consider such amendments to the present law as may be desirable for increasing the power of the local boards of health in reference to quarantining and isolation of contagious cases, and disinfection. There are chances for improvement in this matter, and possibly there are more needed powers which we do not at present possess which might well be added. I refer to one instance in particular, and that is the question of our power over people who have been exposed to disease in houses from which a patient afflicted with disease has been removed. There may be, I think very probably there is,

considerable question as to the exact extent of the power of a local board of health over people who have been so exposed and have not yet come down with the disease. I should like very much personally to see enacted in this State a law similar to that which obtains in our sister State of Maine, and the motion I make is that the committee be authorized to present such legislation as is needed to the present legislature for enactment.

The motion was seconded.

THE CHAIRMAN.—I do not know as I shall be able to follow the motion exactly; but, as I understand it, it is moved and seconded that the Committee on Legislation be authorized to consider the necessary amendments to the existing laws concerning contagious diseases and the powers of boards of health for quarantining the same, and appear before the proper legislative committee to favor such amendments. Is that near enough, Mr. Parker?

MR. PARKER.—Fully.

The motion was carried.

MR. J. C. BRIMBLECOM.—Mr. Chairman, I would move that the same committee, in considering the subject of quarantining and isolation and disinfection, also consider the subject of the present laws relating to the powers of boards of health to remove patients from their homes to a hospital. It seems to me that the present law is not adequate or is complicated in its method, and that the committee be requested to consider the advisability of simplifying and strengthening the law which will allow boards of health to remove persons to hospitals.

THE CHAIRMAN.—I should be inclined to think that that was embraced in the previous motion; but, if the Association feels differently, we will take that as a separate motion and act upon it.

MR. BRIMBLECOM.—If the motion already adopted includes that, I shall be glad to withdraw mine; but I thought the matter of quarantine and isolation did not cover removal.

THE CHAIRMAN.—Does any one second Mr. Brimblecom's motion?

The motion was seconded.

THE CHAIRMAN.—It is moved and seconded that the Legislative Committee be authorized to consider what amendments may be necessary to make the duties of boards of health clear as to quarantining, isolation, and removal of cases of contagious disease.

The motion was carried.

DR. EDWARD A. SAWYER.—Mr. Chairman, in connection with this same matter that has been brought up for consideration, I should like to ask for information for myself, and I find there are others who would like the same information, what authority or what power local boards of health have over parochial schools in this matter which we have just been considering.

THE CHAIRMAN.—I think there are legal gentlemen present who might make this clear. I would say as my own expression that it has seemed to the older boards that the health authority has the same jurisdiction over the parochial school that it has over any other school. It has not been clearly decided whether the local boards of health have a right to close those schools. In some places it has been found necessary for the board of health to order the school closed. I do not think that question has been tested. In most places, however, the advice of the board of health to the school committee has been sufficient to accomplish all that was desired. I should be very glad to have the legal gentleman answer such questions. I think Mr. Parker might say something.

MR. PARKER.—Mr. Chairman, I feel that the Association has already been very indulgent on account of the time I have taken up. I cannot say much in addition to what you have already said; but I will say that we have come to the conclusion in Cambridge, which you have already so clearly stated, that the power of the local board of health over the parochial school is the same as it is over any other school. I will amplify that a little by saying that, if the local board of health felt that the adoption of a certain regulation was necessary to prevent the spread of contagious diseases in a city or town, there was nothing in the law which exempted a parochial school from its operation. I think you told me once, Mr. Chairman, that the Board of Health of Boston had been advised in regard to the attendance of children in the public schools something to the effect that no scholar who had been affected with a contagious disease or who came from a household in which such disease existed should be permitted to return to the school without a certificate of the Board of Health; and the same rule can be applied to the parochial school, when it is necessary to prevent the spread of contagious diseases in the community. We know of no reason why the parochial school, by reason of being a parochial school, should be exempted from such a condition.

THE CHAIRMAN.—We have a statute law in reference to public schools, but the parochial school would not be regarded as within that provision. The parochial school is to all intents and purposes a private school, but with us in Boston there has been the most hearty co-operation with the Board of Health in every regulation and every step that we have taken affecting the schools; and the parochial school management has very gener-

ously acquiesced in all the requirements, so that the question of right has never arisen here. Is there any other miscellaneous business?

THE SECRETARY.—I hereby cast a ballot for the officers of the Association for the ensuing year, which has been read by copy.

THE CHAIRMAN.—My thanks were a little premature, but I repeat them. [Laughter.] Is there any other miscellaneous business?

MR. BRIMBLECOM.—I would like to move "that the committee on legislation be requested to appear at the hearing before the Legislative Committee on Health upon a bill, which is an annual bill, which has been before the committee for seven or eight years, prohibiting the feeding of city garbage to food animals." I was very much astonished last year when I came before that committee, and a bill was before them, to find there was no one representing this Association present in favor of the bill. It was unanimously opposed by the Market Gardeners' Association, and was amended so that it was of no practical value to the boards of health as to the care of garbage. Dr. Osgood told us at our Brookline meeting that 99 per cent. of the cases of trichinosis reported to the Cattle Association was traced to the feeding of garbage to swine, and it seems to me that anything so vitally affecting the health of animals which are intended for consumption should cause this Association to urge upon the legislature the passage of the bill which is now before it. I move you, sir, that the committee be requested to appear in favor of that bill.

The motion was seconded and carried.

MR. COFFEY.—Mr. Chairman, I want to move that the Legislative Committee be increased by two. It now consists of but three members, and there are times, of course, when it might be impossible for one or more of them to be present; and, if the committee were increased, of course we could rely upon it that perhaps two or more might be able to attend whatever hearings might be held, and I would move that the chair be empowered to increase the committee by the addition of two members at some future time. I do not intend he shall do it immediately. I want to give him an opportunity to look the field over and select two men at some future time, and he can notify them of their selection. I make that motion, that the Legislative Committee be increased to five.

The motion was seconded and carried.

THE CHAIRMAN.—I am reminded of an omission to ask the vote on increasing the publication of the *Journal*. You heard the motion which has been seconded concerning the admission of items to the *Journal*. Those in favor of this motion will say aye.

The motion was carried.

DR. SAWYER.—Mr. Chairman, I suppose under the head of miscellaneous business it will be proper to take some action in regard to our next meeting; and I will be just as brief as possible in stating what I have to say. That matter is one of some considerable importance, as there seems to be a growing feeling among the members of this organization that we are not spreading out as much as we ought to; that we are somewhat exclusive, not because we wish to be so, but in the natural course of events; and some members have suggested that, as we had no standing invitation to any of the western towns or cities, we vote ourselves to hold our next meeting at some one of the western towns or cities. Wherever the organization is known and its objects understood, a great deal of interest is taken in this body. Its publications are of great value, not only to the local boards of health, but, I think, to all who are interested in health matters; and it seems to me that, if there is any way by which we can extend our influence and our helpfulness, we should do so. On the other hand, we have a very cordial invitation from the city of Salem to hold our next meeting there; and, in order that the sense of this meeting may be taken, I desire to ask the Chairman if he will put the matter to vote whether we shall hold our next meeting in Salem or whether we shall vote to hold it at some western town or city.

THE CHAIRMAN.—I would say one word to the effect that we might suit one side of the question in April and the other in October. It will be necessary for some motion to be made as to this question. If some one will make a motion, the chair is ready to hear it.

MR. GOVE.—Mr. Chairman, as Chairman of the Board of Health of Salem, I desire to extend the invitation which has been referred to. I make a motion that the next meeting be held in Salem, and we will try to entertain the Association suitably if it chooses to come there.

The motion was seconded and carried.

THE CHAIRMAN.—Is there any other miscellaneous business?

DR. CLARENCE W. SPRING.—Mr. Chairman, we have about 55 cows on our list of inspection in our town. We have a quarantine station. The towns of Sterling and Lunenburg are sending milk into our town without being inspected, and we have done everything we can to stop it. I should like to ask for information if there is any way we can stop Sterling, Fitchburg, and Lunenburg sending their milk into our town without its being inspected.

THE CHAIRMAN.—That would be hardly germane to this part of the meeting.

DR. SPRING.—All right.

THE CHAIRMAN.—Is there any other miscellaneous business? If not

we will proceed at once to the discussion of Dr. Abbott's report on Death Certificates, printed in the last *Journal*. I will call on Dr. Farnham to start the discussion.

DR. FARNHAM.—Dr. Abbott's Report on Death Certificates is one of which the Association may well be proud, and its thanks are due to him for the clear and able manner in which the subject has been treated. So well has the work been done that little remains to be said save in the way of approval. The time is past when it was necessary to contend that our death certificates needed some alteration; for all who have given the subject attention know that upon the correctness of these certificates depend, among other things, the value of the statistics dealing with the death-rates of the various diseases, and of the liability of certain ages and of the sexes to be affected by particular diseases. As some members of the Association are not obliged to read death certificates, and so remain in ignorance of the vexations of those who have to bring some order out of the chaos at times prevailing among them, I will give briefly a few facts gathered from the returns made in Cambridge during one year. The subject has already been treated by Dr. W. Y. Fox, in a paper read at a meeting of the Association held at Cambridge in October, 1894, and published in the *Journal*.

Among the causes of deaths classed as ill-defined, those of most frequent occurrence during the year 1894 were convulsions, marasmus, inanition, debility, natural causes.

Debility must be an accompaniment of most causes of death, if we except sudden deaths from violence.

Natural causes is presumably intended to convey the impression that there is no suspicion of foul play. Neither debility nor natural causes conveys any idea as to what the disease was of which the person died.

Inanition is defined to be "starvation, due to deficiency or mal-assimilation of food" (Century Dictionary). If deficiency of food is meant, it had better be called starvation. If the term means mal-assimilation of food, that is the result of some morbid condition, either unknown or not stated.

Marasmus is defined to be "a wasting of the flesh. The term is usually restricted to cases in which the cause of the wasting is obscure" (Century Dictionary). It is thus the result of a condition unknown or not stated. A convulsion is defined to be "involuntary contraction of voluntary muscles" (National Medical Dictionary). This is obviously a phenomenon that may be due to various morbid conditions seated in different parts of the animal economy.

In the year 1894, under these five terms were grouped 122 cases, about 8 per cent. of all deaths recorded that year.

There were 22 other deaths certified as due to the following causes:—

Abdominal disease, 1; asphyxia, 3; atrophy, 1; dentition, 1; dropsy, 2; exhaustion, 2; heart failure, 9; malarial consumption, 1; neurasthenia, 1; stomach trouble, 1.

There were some other cases, which, though obscure to me, may have had a meaning for the certifying physician; and I have therefore passed them over, giving the certifier the benefit of the doubt.

After physicians have been educated to make out proper death certificates, there will still remain a number of obscure cases in which fuller information is necessary to render the certificate satisfactory; and for the investigation of these cases a body of experts will be needed. It has been shown by our esteemed Vice-President, Dr. Durgin, that there is already in existence a body of officials eminently fitted to discharge this duty, the Medical Examiners. If we can secure the adoption of Dr. Abbott's form for certificates, and the passage of an act requiring examination of and report upon deaths resulting from obscure causes, by the Medical Examiners, then a great step in advance will have been made.

THE CHAIRMAN.—Dr. Macdonald.

DR. W. G. MACDONALD.—Mr. Chairman, I have been very much interested in the matter as presented by the committee. I had a number of death certificates from five or six cities of the country, but they have disappeared from my pocket during the dinner. I do not know what has become of them. However, I do say that at the time of the report I sent to Chicago, New York, Brooklyn, Philadelphia, Baltimore, and New Orleans, in order to get copies of their death reports, which I ought to have here, and which I will let the gentlemen see at some other time. As the result of a comparison of them, I found that our own returns seemed to me to answer the purpose better than anything else. In the first place, in our own reports we have a return which is the right size for binding or the right size for folding as a legal document; second, we have a return that gives the date of death, name, occupation, etc., and it is to be signed by a responsible man, according to his knowledge and belief. We have not yet a list of the diseases that is furnished in Dr. Abbott's report. I believe that in some cities—New York, for instance—there was a book sent around to each one of the physicians, which had a stub like that of a check-book, and the return can be torn off after the physician has filled it in. That return is passed to the board of health. The law obliges the physician also to fill in the stub, so that, if in any way the original report is lost, he will be able to furnish a duplicate. We have not got that, and I do not know that we need it. In some papers I found this at the top, "The physician or undertaker"—which-

ever might be the responsible individual, in a particular city — “shall return this record within twenty-four” or “forty-eight hours,” some within thirty-six, “to the board of health.” That, I believe, ought to be incorporated in our return, for this reason. There are many times when an undertaker makes out a return that is imperfect; and, when it gets to the board of health, it is found to be imperfect, and cannot be taken. The undertaker keeps that return two or three days, and then brings it in within a very short time of the funeral. We are then obliged either to accept an unsatisfactory record or to seriously inconvenience the family of the deceased by compelling a postponement of the funeral. Therefore, I believe in our return we should have at the top, “This return must be presented at the board of health office within twenty-four or thirty-six hours from the time of death.” Then at the bottom of the return, on its face, I think we should have the general statute relating to the furnishing of death returns by the physicians. This is already printed on the return blank in some of our cities. I believe, instead of putting that on the back, we ought to put it right on the face of the certificate, where it can be easily seen. This statute says, “A physician who has attended a person during his last illness shall, when requested, forthwith furnish for registration a certificate stating, to the best of his knowledge and belief, the name of the deceased, his age, the disease of which he died, the duration of his last illness, and the date of his decease; and a physician who has attended at the birth of a child dying immediately thereafter, or at the birth of a still-born child, shall, when requested, forthwith furnish for registration a certificate stating, to the best of his knowledge and belief, that such a child died after birth or was born dead.” That is very important on account of succession of property, for instance. In many cities — Brooklyn, for instance — they have three different death certificates, pink, yellow, and blue. One color gives the ordinary return, the second one gives the return in case of still-born, and the third gives the coroner’s return. In one of the other cities — Baltimore, I think — they have a still-born return besides the regular one. It is a different color and size, so that in every city of importance this “still-born” is seen. We have not so carefully followed that out in Massachusetts. In the Boston Board of Health we have been in the habit of acting in this way. If a return came in and no age was placed against it, we compelled the undertaker to take that back to the physician, and the physician added the words “still-born” to it, if it were a still-born child, or else put the time that the child lived. The rest of the statute says, “If a physician neglects or refuses to make a certificate as aforesaid or makes a false statement therein, he shall be subject to a fine not exceeding fifty dollars.” That is also important. Most physicians do not understand there is any penalty attached to their not certifying the facts on the death return. I have known of cases where the

physician who had been in attendance had refused to sign the certificate because the people had not paid him his fee. If that notice of penalty is placed at the bottom of the return, the undertaker can then compel the physician's signature or report him to the board of health.

Another statute which would be desirable to insert is that "a physician attending a soldier or sailor who served in the War of the Rebellion shall give both the primary and the secondary or immediate cause of death, as nearly as he can state the same. If the physician refuses, he shall forfeit the sum of ten dollars, to be placed to the credit of the town in which he lives." The reason for this is because on the question of pension this record must stand. If the soldier or sailor dies, and the family applies for a pension, the primary and secondary causes of death are known; and there is no chance for confusion, as the primary here means clearly antecedent. The idea is, evidently, to mention those diseases which he might have contracted during service.

Then as to the list of diseases. The list furnished by the committee, I think, is an excellent one. I haven't it about me, but I looked it over. I think in some cases, however, they have not included as many synonymes as they might have done. For instance, I found the word "*anasarca*," but not "*ascitas*." A careful consideration of this point is necessary, because, if you leave a loophole at all for the physicians, they will leave out a word that they ought not to or they will put in a word they ought not to. Therefore, every time we need a synonyme we should put in that synonyme. Then I think a great necessity in this connection would be the idea of looking out for deaths from diphtheria. We receive constantly records of deaths from acute laryngitis, laryngeal spasm, *cynanche trachealis*, etc. It is probable that most of these deaths are from diphtheria, and yet it is hard to act on that assumption without causing some dissatisfaction in each individual case.

So that I think that at the bottom of the list of diseases there should be placed something like this. "It will be assumed in all cases of death," for instance, "from acute throat troubles, that the patient had diphtheria, unless the physician absolutely states to the contrary."

Then I think it might be well to place *pyæmia* and *septicæmia* in that list, which I think are not there, because they are always secondary to something else. It is necessary in some cases to know what that something else is. Then, gentlemen, it seems to me that, with the return which we have at present, the addition of these extracts from the statutes in their places, the return presented within twenty-four or thirty-six hours, whichever we wish to make it, and a list on the back giving the list of diseases already presented with the additions, we shall have almost an ideal certificate.

THE CHAIRMAN.—I will call upon Dr. Chapin, of Providence.

DR. WILLIAM H. CHAPIN.—Mr. President, I do not know that I have anything to add to the discussion of the very excellent paper by Dr. Abbott. One of the greatest difficulties or troubles that we have to contend with is the ignorance of the community. They do not know the cause of death. In very many cases they do not know anything about it whatever. They do not know anything about the names which Dr. Abbott has set out, showing what is the cause of death. I would say, however, that there is one matter which I have used in Providence. I had our certificate printed with quite a large space for the cause of death, and I have encouraged the physician in questionable cases to write out as much as he could about the case. A great many of the physicians have taken to doing that, so that I get a much clearer idea of the cause of death in doubtful cases or in complicated cases than I could if they put the name of one or two or three diseases upon the death certificate without any explanation of the relation between them.

THE CHAIRMAN.—The question is now open for general discussion. We have a few minutes more we might devote to this.

MR. J. A. BURGESS.—Mr. Chairman, in my experience as chairman of the Board of Health in my town, I have some queer opinions from doctors. I find they are a very curious class of people. There were born in my town some time ago twins, which were very small. One is alive to-day: the other lived a few days. The doctor made the return of the one that died that it died of premature birth, and I suppose the other lived from premature birth.

THE CHAIRMAN.—He did not say which one was born first?

MR. BURGESS.—He did not.

THE CHAIRMAN.—Are there any further remarks to be made upon this paper?

DR. GARDNER T. SWARTS.—Mr. Chairman, I wish to say that in Rhode Island we have some conditions which make our duties extremely irksome. I find a great deal of difficulty in separating the condition where insanity is involved; and I have had reports involving, for instance, the question of tuberculosis and dementia, and I would like very much to receive the assistance of this committee in connection with this list here, to ascertain what would be preferable in these cases, as to whether dementia was caused by tuberculosis or not, because I am told by the attendants at the State institutions that it is a difficult matter at times to determine in these cases of dementia as to whether they are brought on by conditions pre-

viously existing or whether there was some brain disease preceding the tuberculosis.

In the disease known as anthrax, I would like to ask the question whether the diagnosis should be accepted as correct when the physician reports anthrax, unless the actual condition of anthrax is present; that is, unless the bacillus is present, and found in the secretions of the abscess. I think that in all cases that should be learned by inquiry from the physician whether he has had a bacteriological examination made. If we do so, the interest of the physician will be encouraged to make more common use of this aid in diagnosis; and it will be of benefit to the profession at large.

On the question of heart failure the committee states that these terms should not be accepted if any more definite term can be given. And it seems to me a more definite term *can* be given in every case where death is caused by heart failure, except in a case where it may be from shock, a sudden cessation of action of the heart, in which case it should be entered as shock, if no previous history is ascertainable. In these cases I think it is as much an unknown cause as it is usually when it is signed in that way. And I personally should much prefer that the physician should sign his cause of death as unknown, owning up honestly that he does not claim that it should be put in a category, than give the indefinite term "heart failure," which is somewhat of a half confession. However, usually, by correspondence with the physician, the symptoms of some previous disease may be obtained; and the physician will in this way give information which he would not otherwise have done, and more accuracy in diagnosis will be the result.

One cause which is frequently sent into our office which is not mentioned in this list is peritonitis, which I do not let go by without learning, if possible, what the cause of the peritonitis was. If not ascertainable, I place it as peritonitis under "causes unknown"; but for the peritonitis there must have been some cause. Sometimes it is a strain from lifting or a fall; but something must have been the cause of the peritonitis, and frequently by ferreting it out this can be ascertained.

I should like to ask in connection with this report, which is made here, whether it is the intention of our committee to go farther, and make a new nomenclature of diseases and classification. I hope that it will be possible for that committee to formulate something which all New England, and possibly other States, may follow, which will permit us to abandon the obsolete terms which at this day have no meaning.

THE CHAIRMAN.—If there are no other speakers on this question, I will call on Dr. Abbott to close the discussion. The time has come when we shall soon have to take up the next subject.

DR. S. W. ABBOTT.—The committee, Mr. Chairman, have hardly considered the question of giving an entirely new nomenclature yet. It is one of those things that I suppose must come. Our old one is getting very fast out of date for reasons that are stated in this paper, but that has not been formulated. I do not know but it may be possible before long to bring some such list before you. Certainly, in regard to tuberculosis there is one very good point which is changing itself; and we know that it does not belong away down in the list under what used to be called constitutional diseases, but it is decidedly an infectious disease, and placed in the same list which used to be called zymotic, but the word “zymotic” is fast going out of date, like a good many others. The whole subject is a progressive one. We have to bear that in mind, and that no list that can ever be made will last forever. Just like all things in natural history and natural science, it is progressive, very much like the whole subject of the practice of medicine; and we cannot make any cast-iron list. Still, I think we shall be able before long to bring forward a list that will be up to the present day.

There is only one other matter I should like to mention; and that is to call your attention to the fact that there was last winter before the legislature, and I think it has been referred to this General Court, an entirely new bill upon the registration of births, marriages, and deaths, which includes some very good amendments, and more, I think, which are quite as objectionable, which did not emanate from any sanitary authority. If it did, I think it would be quite different from what it is. I should like to call attention to one passage on the 90th page, which states that “the records of all public institutions whatever throughout the State shall be required to make a separate report of deaths.” I think that is a very important thing. You all know in your own towns and cities that your death-rate is increased by the number in the institution; that you may have in an institution a higher death-rate than the town itself, unless it be one for young people, vigorous boys, like the Lyman School up at the other extreme of the State. The State almshouse at Tewksbury has an enormous rate, twenty times that of the town of Tewksbury; and in some towns in their reports those are included. The Somerville Asylum, for instance, is always included in the reports of Somerville. At Westboro the deaths in the two institutions there go into the report of the town of Westboro, but they do not belong there. They are people from outside, and should be classed outside. Of course, they are part of the State death-rate; but they should be classed by themselves always in making up a general report. It is always so in every foreign country that has any amount of progressiveness about it. I do not know that there is anything further that I would say, Mr. Chairman.

PROF. H. C. ERNST.—Mr. Chairman, in conversation to-day and in the speaking I have noticed the same condition that apparently exists generally in regard to these diseases in the use of the terms “infectious” and “contagious.” It appears to me that it is a pretty important matter to settle that definition. I should therefore like to move that this committee be requested to settle that definition, and adopt one term or the other for general employment in the designation of this class of diseases.

The motion was seconded.

THE CHAIRMAN.—It is moved and seconded that the Committee on Vital Statistics be asked to consider in their work the definition of “infectious” and “contagious”; that they adopt one or the other, the preference being given to “infectious.”

The motion was carried.

MR. E. L. PILLSBURY.—Mr. Chairman, in order that more light may be cast upon the subject under discussion, I would move that the Committee on Vital Statistics be requested and authorized to give further consideration to the subject.

The motion was seconded.

THE CHAIRMAN.—It is moved and seconded that the Committee on Vital Statistics continue their good work in the consideration of death returns and nomenclature of diseases.

The motion was carried.

THE CHAIRMAN.—The next business in order is the discussion of Culture Diagnosis in Diphtheria, by Professor Ernst.

CULTURE DIAGNOSIS OF DIPHTHERIA.

BY PROFESSOR H. C. ERNST.

Mr. Chairman and Gentlemen,—In speaking of this question, which appears to be of importance, and of constantly growing importance, as I think I shall be able to show you by some figures that I shall give you, and in describing the methods employed, I shall give as accurately as may be those which we ourselves use in this city, which, we think, are the best, of course, —because, if we thought there were any better, we should have adopted them.

In the first place, the whole value of the culture diagnosis of cases of suspected sore throat depends upon the fact that the bacillus of diphtheria develops more rapidly than other bacteria that usually grow in the mouth, upon a special nutrient medium and at a special temperature; and these conditions must be fulfilled as nearly as possible, and, if any of them fail, by so much the accuracy of the diagnosis is diminished.* In fulfilling these conditions, it is necessary to take into consideration the applicability of the methods adopted to a very large field; and these are the points that we have attempted to work out in our line of investigation in this direction.

The basis, of course, of the whole test is the proper preparation of the nutrient medium. We have seen no reason at any time to adopt any change from the original so-called Loeffler's sugar serum, which is a mixture of blood serum and bouillon, with a definite amount of grape sugar added. These are mixed in the proportion of two parts of serum and one of bouillon, and then sterilized. We have made a slight modification in the method of sterilization that is quite commonly used now, and consists of the addition of an average of one-half of one per cent. of caustic potash to the blood serum. This takes advantage of the fact that has been known for a long time to physiologists: that, if a certain proportion of a strong alkali, like caustic potash or caustic soda,—varying in percentage with the different forms of albumen,—be added to the albuminous material, this mixture of fluid albumen and caustic potash may be coagulated by a high degree of heat without losing its transparency. This, of course, is a very great advantage in the preparation of albuminous nutrient media upon the large scale that is necessary in such a work as ours, because it shortens the length of time necessary at least one-half. After having added this proportion of caustic potash (0.5 per cent.), which is the alkali which we use, the mixture is at once placed in the sterilizer, the ordinary serum inspissator which is known in all bacteriological laboratories, and subjected to a temperature of a little less than that of steam, of about 98 degrees Centigrade, for an hour or two. That serves the double purpose of sterilizing and solidifying the nutrient medium, so that further sterilization may be completed in the same apparatus, and the tubes be all ready for use on the third day instead of on the seventh or eighth day. Just at present I am expecting daily a new form of sterilizer that I have had constructed in New York, consisting of a steam jacket somewhat similar to those that are used in some hospitals, but with changes which will enable this sterilization to be carried on under pressure and completed in the course of ten or fifteen minutes. This will again shorten the time necessary for the sterilization of the serum.

The second point in regard to the nutrient medium is the necessity for a free supply of blood serum. That we obtain — not without some difficulty,

because we need a great deal of it—at the Brighton abattoir, where it is collected under the supervision of the veterinarian of the board, Dr. Burt. The serum is sent for from the laboratory at least twice, not infrequently three times a week, and is put through the method of preparation of which I have spoken. The tubes are the ordinary size used in the laboratory, 6 inches by $\frac{1}{2}$ inch. This is a matter of necessity, because it would be almost impossible to keep the different styles of tubes separate because of the constant call for the cases, and the confusion that would occur in the laboratory if one branch of the work were carried on with one size, and another with another. Still, I should not change the size of the tube now if it were possible, because of a point which I shall speak of a little later.

In making cultures, it is a wise plan to have plenty of the nutrient medium, because, by having a proper surface for the growth to develop upon, it enables a much more accurate diagnosis to be made; and, as will be seen with these (exhibiting tubes), after sterilization a small amount of water condenses. That collects at the base, and assists in keeping the nutrient medium for a greater length of time by keeping it moist. The drying is further prevented by covering the tubes with these rubber caps, which I at last succeeded in having made in this country at somewhere near the same price at which they could be imported. In fact, as it is now, I can secure them at exactly the same price as the cost of imported caps; and their importance lies, in the first place, in preventing the evaporation of moisture, because it is hardly necessary to repeat the fact that the cotton in the end of the tube acts not as a cork, but simply as a filter. It is not a plug to absolutely prevent the entrance of air, but simply a filter to filter the air, and filter out bacteria. In the second place, the cap acts to prevent the forming of moulds upon the surface of the cotton plug, and their gradual growth through the interstices of the cotton, which is one of the main causes of contamination in case the tubes of nutrient media are kept for a long time.

The next especial point of the method that is used in the diagnosis of diphtheria in this city is the use of these copper cases, which are the result of an evolution that has been going on for three or four years in the laboratory. We began when the call for tubes of nutrient media first occurred, by having prepared a rather expensive box with the old-fashioned velvet lining, and a good deal of elaborateness about it. That was altogether too expensive for any such demand as this culture diagnosis seemed likely to create; and we have had various forms of boxes, as our ideas have changed, until, finally, we have settled upon this, and we have now had them in use for a year. The supply has been increased as fast as we could have them made, and so far I know of nothing that compares with them for the purpose for which they are employed.

As you see, the box consists of the box proper and of the case, which has no bottom. The box is made of a single piece which is moulded, and contains a place for two tubes, and hollow for the wire, with a ring to assist in pulling it out. That is really unnecessary, because it can be pushed up from the bottom in that way (illustrating).

When these outfits are returned to the laboratory, the tubes are removed, the box is sterilized, and can be used over and over again with perfect safety.

The object, of course, of the stamp upon it, is to show where the box belongs. The object of the number is in order to keep some sort of control of them. When the boxes go from the laboratory, the person who takes them is charged with the number, and once a month or once in six weeks, as the case may be, the record is gone over; and, if we find that the boxes have been kept out for six weeks or more, we send notice, and request their return for inspection. The reason for this would make itself easily apparent if any one has to do with this sort of thing, because, in the first place, many physicians get them, and forget all about them. In the second place, as a rule, the life of the tubes without contamination is about six weeks. If the sterilization is very complete, and if the cap is put on before the moulds are enclosed beneath it, and above the cotton, the life is indefinite. But we cannot depend upon that, so we like to change the tubes once in six weeks; and that is the object of the practice of sending out for them.

The wires are of the form devised by Dr. McCollom, consisting of platinum wire, which is swaged into a heavy brass wire, which again fits into a handle, making the outfit as nearly complete as possible.

Of course, the main difference between the method that is used here and that that is usually employed is the difference between using this platinum wire for the purpose of securing material for cultivation and the use of a cotton swab, a small piece of cotton wound around the end of a probe or piece of wire. The advantages of the cotton swab are that it is easier to use, that it is not common to injure the struggling child, and that with it you can take up a very much larger amount of material.

Now, in the first place, if this platinum wire be properly used, it bends very easily; and it would require a good deal of lack of skill to injure a throat with it, particularly as the point is bent over. If any of them go out of the laboratory where that is not the case, it is an oversight. As a rule, they will be bent over. In the second place, the wire takes up a very small amount of material, which is a great advantage rather than a disadvantage. It is necessary to have an extremely small portion of the material to be examined, in order to detect any bacteria that may be present. And, lastly, the method of inoculation furnished by the wire has a very great advantage that we see exemplified every day in our examinations. According to the

directions that are sent out, the wire is to be touched to the throat, and then is to be drawn along the surface of the nutrient medium in three parallel lines one after the other without reloading. The object of this, of course, is to distribute the major portion of the material collected on the wire on the first stroke, and a smaller portion on the second, and, practically, all that remains on the third. In this way the bacteria are more or less separated from each other, and the culture, if properly done, practically amounts to a plate culture; and in innumerable cases we have it occur that there will be one fine dot representing a single colony of the bacilli of diphtheria that has been singled out by this method of isolation on the surface of the nutrient medium. I can only say now, as I have stated before, that the results seem to us to justify most emphatically the use of the wire for obtaining material for cultivation rather than the swab for the general purposes of a diagnosis, and the results are more accurate. It is a little more trouble to the physician; but, because the results are more accurate, it seems to me as though there were no question as to what should be used.

The culture having been made, the method of transportation to the laboratory is the next point. In the first place there are a number of stations scattered throughout the city, under the Board of Health, at which these cases may be obtained by those living in the neighborhood. A definite time is set at or before which each case must be returned to that station, in order to secure transportation that day to the laboratory. That hour has heretofore been twelve o'clock; but I believe that in the coming year the chairman of the board has in mind to make the hour still later in the afternoon, and to have a special agent of the Board of Health collect the cases and bring them to the laboratory rather than depend upon persons at the stations to send them. If the cases are not returned to the stations by twelve o'clock, as is the practice to-day, the physician himself must see to their transportation to us before six o'clock; and, if that be done, the tubes are at once placed in the incubator, and the resulting examination is made upon the following day, a point—that it does take over night at least to get the results—which the general practitioner frequently does not seem to realize. That is a length of time which seems to many practitioners to require shortening, but it is not possible to shorten it. The necessity of the test forbids the result being reached until the next day. But there are differences in the way in which those results may be sent out. The method that we have adopted is that the cultures are all examined together, the examinations beginning at about eight o'clock in the morning, the staining being started at that time. A single report cannot be sent out any earlier than all the rest: they must all go together, in order to secure the best average speed. But the microscopic examination never depends upon one man alone. That, it seems to me, is also a great point. Cover-glasses are

prepared by two assistants, who may be spoken of as the two junior assistants. A probable diagnosis is written down by each one of them; and each record is gone over by what may be spoken of as the senior assistant, and the final diagnosis is settled. If there is any question in regard to any particular case or any difference of opinion, the matter is referred to me.

Then the reports are sent out upon blanks in accordance with these three. There is the first one. "The culture submitted by you yesterday from" . . . "shows the presence of the bacilli of diphtheria." That card is sent by mail. If there is any special reason for haste, there is a telegram sent as well; and frequently there is a special delivery stamp as between the two.

I have declined from the beginning to send any reports by telephone; and I am extremely glad I did so, because in either of these means, a communication by telegram, of which a copy is kept, by a letter or a card, of which a record is kept, we have some way of answering complaints, if they are made. A telephone is not only a great servitor, but it may be a great nuisance. If there is any mistake in the name or anything of that kind, in sending a message over the telephone, one has no record and no protection. So, as I say, from the very beginning I have declined to send reports by telephone.

The second of the blanks that we send out is, "The culture submitted by you yesterday from . . . does not show the presence of diphtheria." Which should be altered so as to read "does not show the presence of the bacilli of diphtheria."

The third blank is one which has been already modified. It reads now, "The culture submitted by you yesterday from . . . shows no growth. The test therefore is of no value. Will you be good enough to send us a second culture?" and so far I have heard no complaint about this wording. As it was at first, after saying that "it shows no growth," the words used were, "There must therefore have been some error in technique," which was the most innocent expression on our part that could be imagined, but apparently it aroused the wrath of about everyone who received the card. It simply meant what this card means, that for some reason there was no growth. It did not mean any criticism upon the individual at all.

These are the three blanks, then, that are sent by mail; and, as a rule, within the city limits the reports are received in the afternoon. We have made special arrangements with the postal authorities by which our mail is received after the closing of the regular mail; and the reports are all sent by the 1.30 post, or at the latest by the one following. And this does not mean only week-days. It means every day in the year, Sundays and holidays as well, which is one of the great points, that the work is never stopped; and I think the profession in Boston are appreciating that more and more every day. Last year we used to have a very large drop in the

number of cases that were sent in upon Sunday. This year and with each succeeding week the number of cases is increasing upon Sunday, because the medical profession begin to know there is no stop to the work on that day. Cases are just as ill with diphtheria on that day as any other, and we have discovered that examinations can be made upon that day as well as any other day of the week.

One word more in regard to the cases. Three blanks are sent out with each case. The first contains directions for making cultures; and, with the exception of altering the hours, I have seen no reason for changing the wording at all since we began. The change of the hours will probably be made as the board perfects its further arrangements. There have been cards, one for each tube, sent out ever since the beginning, containing spaces for the patient's name and address, the physician's name and address, the date of the first, second, and third culture, and so on. Upon the back was simply printed the word "Remarks." As a rule, that blank did not bring us any clinical information; but it brought us many complaints [laughter], so that quite recently we have filled up that space, and, if complaints are to be made, they must be sent upon a special note from these new data, which we hope the profession will take pains to fill out, and I think they will. We expect to get some extremely valuable information. We request the questions to be answered as to the purpose of the culture, the age of the patient, duration of the illness, whether membrane is present or not, as to the presence of nasal and laryngeal symptoms, and a statement of the clinical diagnosis. Then there is a very small space at the bottom for any general remarks that one desires to make. I think that any one will see that, if these blanks are generally filled out, in connection with the work of the board with the anti-toxin of diphtheria, at the end of the year we shall have some extremely valuable information, not only as regards this method of diagnosis as compared with the clinical diagnosis, but also as compared with the use of anti-toxin in the various cases.

These blanks are sent back to us. Each case goes out with fresh ones; and, if the second culture is returned, the date and result are posted upon the original blank sent in the first place by the physician, all of which are filed according to the name of the patient, so that we have the records complete from the beginning. And if any question is raised in regard to what became of such and such a culture, and in regard to such a patient, when he was ill and so on, or when he received the culture, we have that information filed in the original handwriting. It would be extremely interesting, I think, to know how many cases come in, in which the physician takes neither the pains to fill in the name of the patient nor his own. We have an average, I should think, of ten cases a week where we have absolutely no data upon which to return a report; and then in the course of a week or so after

that the shower begins. [Laughter.] "This does not amount to anything. You did not manage that right." And we show them the blank card, which we keep in a special box. It is very common to have incomplete data, and especially a number of physicians are accustomed to sign only their last name without any address, so that a number of reports have gone wrong; but, taking into consideration the amount of work we have done, it seems to me it has been done with absolutely as little friction as could be expected.

Now, in regard to this question of "No Growth." I have told you that on one of the blanks we send out the fact that no growth occurred; and it seems often, no doubt, to disturb the physician more than anything else, more than our saying he has a case of diphtheria when he thinks he has not or that he has not a case when he thinks he has. The fact that he did not get any growth at all seems to be particularly embarrassing to him. I think the reason for these no growths occurring is very largely because the physicians do not pay sufficient attention to the directions for making a culture; and I think this is certainly carried out by the fact that the proportion of "No Growth" cultures being sent to us is diminishing, and diminishing quite rapidly. As an illustration, in the last week there were three hundred cases sent in for examination. Out of those three hundred there were only two cases of "No Growth." The reports are sent not only to the physician, but, of course, upon request they are sent to the patient as well; and, as a matter of routine, every day a full list of the reports of the cultures, the name of the patient and the address, the name of the physician and the address, and the result of the examination, with dates in each case, are sent to the Board of Health Office, and in that way they have, as well as we, a complete record of every case that is examined and all the work that we do. In addition to that we have recently adopted the plan of reporting on the cases sent in for release directly and immediately to the board, and I believe that within the limited time that the plan has been adopted it has saved at least twenty-four hours in each case for the releasing of the patient and disinfection of the premises. Is not that true, Dr. Durgin?

THE CHAIRMAN.—Yes, twenty-four hours to three days.

PROF. ERNST.—Twenty-four hours to three days. So it seems as though that method were going to make the results available as promptly as can possibly be expected.

Now, in regard to the amount of work that has been carried on by the board during the last year, or rather during the last fourteen months. It began upon the first of November, 1894; and I have here a chart showing, by weeks, the number of cultures that were sent in, the number of new

cases, and the number of positive cases during each week from that time until the first of January, 1896, which gives a total of 8,644 examinations made for physicians of this city during the fourteen months preceding this. And it is exceedingly interesting to see the variations in the curves. In the first of the time the rise is extremely rapid, because, in the month of November, 1894, the profession was becoming aware of the fact that these examinations could be made. Then the number sent in holds about the same until the time of the closing of the schools at the Christmas recess; and during the period from Dec. 23 to Jan. 6, 1894 and 1895, there is a very marked drop in the number of suspected cases, accompanied by a fall of the actual number of cases of diphtheria, as is shown upon the curves, as you can see when the chart is passed around. Then there is a marked fall in the number of cases sent in through the summer months, reaching its minimum in the last week in August. From the time the schools begin, as you can see, the rise has been very sharp until again we reach the time of the Christmas recess, when it falls. I think it is a very remarkable fact that is shown by this chart that the idea in regard to schools being extremely influential in the spread of this disease is a well-founded one. All the percentages for the various months are worked out at the foot of the chart.

The next question is a very practical one, and of general interest in regard to the relative value of this method of diagnosis as compared with the clinical diagnosis of diphtheria. That is, it appears to me, an extremely important point; and it also appears to me (and I mean no self-laudation at all in making this statement, because the result could not have been reached without the most active and generous support of the Board of Health, and without the active assistance of the gentlemen assisting me) that we have raised the percentage of accuracy of this method of diagnosis to a very high degree. And, as to individual opinions that this is so, we have had an extremely complimentary and voluntary tribute to the work in a recent number of the *New York Medical Record*, which was called to my attention yesterday; and also it happened yesterday that two physicians in the city, who have sent us as large a number of cases of this kind as any other two, I think, in the city, in the course of conversation said that, in every instance during the past year where their clinical diagnosis had crossed our cultural diagnosis, we had been shown to be right by subsequent events. I do not suppose that this holds in every case. It would be absurd to suppose so, to think it for a moment; but it does give evidence that the percentage of accuracy in this method may be raised to a very high degree, and that it is certainly an extremely important addition to the methods of diagnosis is, it seems to me, wholly unquestionable at the present stage of our experience.

This brings up another question of practical interest; and that is as to when the physician should report the case as one of diphtheria, whether upon his clinical impression or wait for the result of an examination. Of course, these cultural examinations depend entirely upon the honesty of the physician. As one gentleman said to me in the laboratory three or four weeks ago, "What would you do if I wanted you to decide, and I made a negative culture, having taken the culture from the patient's hand?" Well, of course there is nothing to be said. We depend in the first place upon the honesty, the conscientiousness, of the medical profession. It seems to me as if that was all we needed as evidence. As to whether a person should report a case as one of diphtheria before or after receiving a report from us, if it be true that the percentage of accuracy with these cultural diagnoses is very high, it would appear to me as if it would be well to wait until he received a report from us, having made the culture under proper conditions. The reason for this is illustrated by one of these physicians that I spoke of, who told me yesterday of a case in which he had been assured that there was diphtheria. There were all the clinical symptoms of it, according to his mind; and he went so far as to notify the Board of Health to put up the card, and on the following day he received a negative culture from us. He sent in two cultures after that, and received three negative reports. The patient had recovered practically, was practically well in three days.

It does not require very much extra isolation, if a patient has a bad sore throat. He should be kept quiet any way, and he can easily be isolated for the length of time that it takes to make this examination. Equally, of course, in such a case, if there was reason for expediting the report, that can be done if it is stated upon the card when it is sent in.

Then, again, as to how many negative cultures are necessary for release. That also is a point that can hardly be settled to everybody's satisfaction. It would appear to me that, if a patient clinically is well, one negative report is all that is necessary. I do not see any reason for keeping him in quarantine after the clinical symptoms have disappeared, if the report is negative. We had also an extremely interesting instance of that sort yesterday in a gentleman who has been ill with diphtheria, was ill last week. He has been one of my assistants, and entered the laboratory on Monday, and had a culture taken, which was negative. He came in again on Tuesday. A culture was taken in the laboratory, and he came in yesterday morning to see the result. The result was positive. He had diphtheria bacilli present; but he himself was apparently perfectly well, and at the time the health officials were fumigating his house. A third culture was taken at once, and again it was negative. Now, the point about that is that the bacilli were present; but they were not producing any symptoms

in him. What we found in that second culture, a positive culture, was a minute focus where there were a few bacilli present; but to say that that person was affected with diphtheria would have been absurd, because he was really immune. He had just recovered from an attack, and it would not have been worth while to quarantine him further.

Another serious question is that of cases of delayed release; that is, in which the bacilli persist for apparently a long time. A point is raised as to whether these bacilli are or are not virulent, and that is left to us to decide. As to deciding it in individual cases, it is extremely difficult, for the reason that in every case in which we have attempted the decision the length of time necessary for securing a pure culture and the results of inoculation has been longer than until a negative culture from the patient himself was secured; and, therefore, it seems as if in delayed cases it was safer to depend upon successive cultures than to depend upon the inoculation experiment.

The last point of which I have to speak is as to how long these culture tubes will remain good, one that I have already touched upon. The length of time on the average is six weeks. Of course, a thoroughly sterilized tube, which has been plugged and kept under aseptic and antiseptic conditions, will keep an indefinitely long time; but, where from one to two hundred tubes a day must be prepared, haste is necessary, and moulds might get in between the cap and the rubber stopper, as is the case not infrequently, so that contamination may become manifest in the course of six weeks. We have had boxes brought back to us which were perfectly good at the end of six months, but it would not be safe to depend upon that length of time. They should be changed, as I have said, about once in six weeks, certainly examined as often as that.

Dr. Durgin suggests a statement in regard to the time after the culture is made before it should go into the incubator; and that should be, of course, as soon as it can reasonably be done. If a culture be made and sent to us, it should be got to us within a few hours after. If it be kept cool, it is a matter of practical indifference when it gets to us. That is to say, if the growth of bacteria be hindered by a low temperature, it may come to us at almost any time, and then be placed in the incubator, as is done as a regular thing in the late afternoon.

That is all I have to say, unless some gentlemen present desire to ask me questions.

MR. PILLSBURY.—In regard to the case that the doctor stated of the gentleman who had had no diphtheria bacilli present at one time, and then bacilli were present at another, and as to not having virulent diphtheria bacilli, and therefore not having diphtheria himself, I would like to ask whether there was any danger to the rest of the community from his being out, and as to whether he should not be still quarantined on that ground.

PROF. ERNST.—Yes, quarantined on that ground; but my point was that, as I believe has been shown by this second culture, and as I believe will be shown by any number of cultures taken on successive days, they will go on being negative, and the patient himself was free from danger.

QUESTION.—Would that be called a case of diphtheria?

PROF. ERNST.—I suppose, if it occurred originally, it would be reported as a case of diphtheria; but it had been already reported. He had been sick and gone through the symptoms and had recovered, so it could be hardly necessary to report it again.

THE CHAIRMAN.—I will announce the addition to the Legislative Committee as being Mr. Parker, from Cambridge, and Mr. Pillsbury, from Boston. I will now call upon Dr. Swarts.

DR. GARDNER T. SWARTS.—Mr. Chairman, I have a great deal of diffidence in attempting to approach the discussion of the remarks made by one who was my instructor. I hope that I may be excused if I should differ somewhat in the conclusions reached by the presentation of the subject. Another thing which leads me to speak rather closely and rather mildly is the fact that the number of cases naturally coming from the small State of Rhode Island does not begin to compare with the number in this city, and consequently must have less weight when compared with the numbers presented by Dr. Ernst. Therefore, I will merely give my experience as being an addendum, and bearing upon the results in Rhode Island.

One of the first difficulties which was met with by our board is that physicians do not fully understand the method of making the culture; and under that condition it results that the tubes, as has been stated by Dr. Ernst, are liable to be lost or liable to disappear. Out of four hundred tubes sent out during the first six months of the last year, two hundred have entirely disappeared. They were seized upon by the physician, and placed upon the shelf as souvenirs of the advance in medicine. The board, therefore, are now having a large number of dry tubes sent in; and that is the point which brings up the question of the method of taking the culture. The method which is adopted by us in taking cultures is the same as has been stated by Dr. Ernst, except that we use the swab. The culture is intended to be the same, the preparation of the culture may be the same, and the evaporation of the tubes is the same. The reason for using this form of distribution and transportation was simply the result of having copied from the city of New York, and are the same methods which are now being used in Brooklyn, Denver, Washington, and other large cities. The method, as some of you may be aware, is in the use of a smaller, shorter. These are one containing the nutrient serum and the other the swab, in a small box,—just an ordinary school pencil box; and, the tubes to be examined having been

sent from the manufacturers in the first place in a rather heavy form, that condition has been retained, for the reason that, if the tube is dropped upon the floor, it is not so liable to break as a lighter tube, thus avoiding loss of the culture in transit and contaminating from the breakage.

In the use of the swab the additional advantages claimed by those who make use of it are that, in the first place, you approach the patient with less fear of doing injury to the mucous membrane of the throat. If you have a child in front of you, the mouth wide open, and several persons holding that mouth open, the opportunity of getting at the back of the throat is very small; and, if a wire only is used, it would be a difficult matter for the physician to reach the membrane that he was looking for, especially if he did not see that point. Assuming we desire to get at the membrane, and the physician is clinically able to distinguish a diphtheria membrane from one formed by the accumulation of micrococci, streptococci, or starch, and can see and touch that membrane, we may be able to get the culture that we are looking for.

But I claim that, if the mouth is entirely open and the swab can be swept over the arch of the fauces with a twisting motion, so that the swab will cover all parts of the arch and pharynx, we shall run a better chance of obtaining a better average of what there is in the throat than if we take it from one spot only.

If, as a laboratory expert, one could get the particular amount that we wanted, and could place it as a "streak culture" on the serum, it might be easier to isolate the given colonies.

The disadvantage of two cultures with a made wire probe is that it necessitates a second struggle with the patient, which, in many instances, increases the action of the heart, which is already sufficiently depressed by the action of the toxins present.

In this form of culture kit we have a wire which is just the ordinary coppered wire, wound with absorbent cotton; and the swab and wire are thrown away after being sterilized.

The use of the box is of no special advantage that I can see, except that it is small, and is somewhat more readily carried in the pocket of the physician. One advantage which Dr. Ernst has told us of is the rubber cap, which prevents the evaporation of moisture in the tube, and is a most important point. We endeavor to overcome that by wrapping the whole box in a piece of ordinary waxed paper; and in that condition, to a certain extent, it prevents evaporation, and also serves the purpose of preventing the chance of carrying the material from place to place.

In regard to the growth of organisms Dr. Ernst has laid great stress — and rightly, I think — upon the length of time necessary. My experience has been, of course, limited; but it is that it requires at least fourteen to sixteen

hours' growth before one would be willing to make a diagnosis or express an opinion upon the growth which has appeared upon the serum. Another advantage in the use of the swab is this, as has been frequently shown recently: The swab is used by the ignorant practitioner on dried serum, and it is sent to the laboratory with no moisture on the serum, but with the swab still infected. In these cases we have the swab, and it has been of great service in making a fresh culture at the laboratory. A great difficulty is found with us, as in this city, in the non-observance of directions by physicians. Frequently left in on top of the serum, which is one against the swab; but that is of course caused from the ignorance of the practitioner and a lack of attention to the instructions.

The question of making a positive diagnosis upon the first examination is one which I think will come up in the future. A culture is sent in, and the result is reported as negative: there are no bacilli present. Examination has shown in one or two instances, where the physician was doubtful about the bacteriological report, and sent in a second culture, and the second culture was positive, it may have been due to a lack of technique with the bacteriologist or on the part of the physician.

As to reports by telephone, it is a disadvantage especially to the ones who have to telephone; but it is an advantage where the message is received properly, and our practice has been that we will not give it unless there is some one who can receive it properly. By this means we cause a more rapid dissemination of knowledge, which is necessary to the physician. Our collections are up to five o'clock in the afternoon; but, if they come after that time, they are sent to my residence, and placed in an incubator there, for the purpose of carrying them over to the next day. All that are received by five o'clock can be usually reported on by half-past nine the next morning, frequently before the physician starts on his rounds. He has, therefore, the advantage of a little time there. Sometimes, if you are a little later with the report, the physician says, "It is not now necessary, as my patient is dead."

As to the method of raising the quarantine, I think Dr. Ernst intended to make it clear — I am not sure whether he did or not — as to the necessity of two negatives, as is to be the practice with us. Our experience has been that two negatives are necessary. The rule has not been fully adopted as yet, but it will be.

As to there being no growth, the physician may mistake the purport of the report. When he has the report sent to him that there is no growth, he may consider that there is no disease there whatever, since he thinks that he has made no mistake in his technique. The fact is that there is always something to be obtained from every throat.

A matter which I would like to have Dr. Ernst consider in his summing

up is the question of the possibility, which has been proposed by some bacteriologists, of getting an immediate "snap diagnosis" from the swab, assuming the swab is used of course. It has been done with a certain amount of success by the authorities in Denver, by making a cover-glass preparation from the contents of the swab. In a discussion which occurred on this subject at Denver recently, Dr. Kenyon, of the Marine Hospital Service in Washington, said that twenty per cent. could be obtained in that way. It is not a method to be depended upon; but, when one is in a great hurry, it might be of great service if the Klebs-Loeffler bacilli were found to be present, but could not be relied upon if the examination was negative.

As to the virility of the organisms in the throat, the necessity of quarantine has already been brought up; and I will not refer to that.

The blank which is sent out by our department asks for the name of the maker of the culture, which gives the information whether it was made by a physician or by some one else, or was left to the patient, as is sometimes the case, but should never be. It leads us to make a judgment as to whether the culture was properly made or not, the date, time, and occupation, the attending physician, the duration of the disease, in order to make a study of the character of the organism to a certain extent, and as to the location of the membrane; what, if any, applications have been made to the throat; if so, how long before taking the culture. I do not know that anything will ever come from that; but it might be that some local application may have had an effect to inhibit the growth of the culture, and might serve to tell us what we should use for a remedy. Of course, at the present day we know of nothing. Then the question as to the first or second culture follows after that in the questions to be answered.

The question of the examination of throats found to be suspicious is a question that comes up for consideration with us, so much so that Dr. Chapin, superintendent of the local Board of Health of Providence, has issued notice to all physicians, stating that all cases of sore throat must be examined or, if they are not examined, and a case comes to the notice of the health board, the health board will take the liberty of examining the throat, if possible, or placing a placard on the house, as may seem desirable. This, of course, seems to be an arbitrary measure to the physician; but it is grounded upon these points,—that, if there is a sore throat which is sufficiently bad that a physician should be called, he maintains that that physician is not upon his clinical examination alone able to make a correct diagnosis, and the diagnosis should be made negative or positive.

As to reporting cases to the health department. The physicians are requested to report all their cases of suspected diphtheria to the department; and, in case it is found to be a negative, a card is not put on the door, but, if deemed necessary, a card is put on and does not come down, nor can the child attend school without a negative result being shown twice.

THE CHAIRMAN.—Dr. Smith.

DR. THEOBALD SMITH.—Mr. Chairman, I have scarcely anything to add to the description which has been given by Professor Ernst and the remarks that have been made by Dr. Swarts. There is one point, however, which it seems to me should be emphasized; and that is that all diagnoses of diphtheria are tentative and liable to be erroneous. Any one who has ever given any attention to bacterial diseases of the mucous membranes knows how exceedingly difficult it is to isolate those bacteria. Diphtheria seems to be one of the fortunate exceptions to that rule, and it is something the medical profession should be thankful for that a diagnosis may be made from the mucous membrane. There are, however, for the reason given, limitations of the method; and it seems to me that any bacteriological examination of a diseased throat that reports negative results must be taken with a certain amount of reserve, and that any examination which reports the absence of diphtheria bacilli in the throat ten days, fifteen days, or twenty days after convalescence, must always be taken with a certain allowance. Recovered persons should not, within a number of months, kiss any small children or in any way make it possible for certain germs from his or her mouth to be transmitted to others. I think the organism of diphtheria, and I believe we all think so now, is conveyed almost directly from person to person. It is not very long ago when sewer gas was regarded as a fruitful source of infection. It is only a year or two ago when one of the prominent members of some State board of health spoke to me about the sewer-gas theory as one to be reckoned with. I, at that time, told him that the trend of bacteriology was in an entirely different direction, and that direct infection from person to person was far more probable. To return then to the first thought of my remarks, I would state that in all cases of negative diagnosis, or in all cases where diphtheria bacilli are supposed to have disappeared, or where the clinical and the bacteriological diagnoses fail to agree, the attending physician should not consider the diagnosis clean cut. He should at least inform his patients that caution is necessary. It seems to me that the direction which bacteriology is taking is away from very definite diagnoses. We know that in Germany during the past two years many persons have been found who carry cholera germs in their body during the prevalence of this disease. They have received the name of "cholera carriers" because the living germs have been found in their fœces. They are, as a rule, perfectly well. The same is true of diphtheria. We know that pneumonia germs exist in the throat, and it is probable that other disease germs are carried about by healthy persons. It is these facts of the possible unsuspected presence of disease germs which are going to give sanitarians most trouble in the

future. The question has been asked whether diphtheria bacilli in the mouths of very mild cases or of healthy persons are virulent. To answer this question, I may state that there are two factors in the production of infectious disease. One is the person, the other is the germ. The person may be in such a condition that a virulent germ has no effect upon him. We know from experiment that in certain species of animals certain bacteria produce no effect, while toward other species they may prove very virulent. We can change experimentally a rapidly fatal septicæmia by immunizing the animal until either no effect at all is produced or else a mild or chronic affection only. So it may be with diphtheria. The presence of diphtheria bacilli, which do not produce disease, is no proof that they are not virulent. They may be highly virulent: they may even start a general epidemic. I simply speak of these as things for the physician to bear in mind in case difficulties arise which he may not have anticipated or provided for.

It seems to me that there is one point which has not been insisted upon by the gentlemen who have spoken, that is, that the returns should indicate absolutely the stage or duration of the disease when the culture was made. The rapid substitution of the specific germs of disease for other germs, such as streptococci, staphylococci, and putrefactive species on the mucous membrane, is something surprising, and accounts for the difficulty of finding bacteria in late stages of the disease. Hence, in those cases from which cultures are obtained comparatively late in the disease, a negative result is not to be relied upon as proving the absence of diphtheria bacilli. In regard to technique, we all know that every method has its advantages and its drawbacks. I think perhaps, on the whole, that the swab might cause the fewest negative results in the culture-tube, because more of the membrane or exudate would be taken with it and transferred to the tube.

THE CHAIRMAN.—We should be sorry to leave this subject without the practical side being presented, and I will call upon Dr. Shea.

DR. T. B. SHEA.—Mr. Chairman and gentlemen, since the diagnosis of diphtheria has been referred to the bacteriologist, conditions have arisen which to us charged with the care of these cases occasion not a little worry and anxiety. I refer especially to those mild cases of diphtheria presenting in themselves no clinical evidences of the disease, and no history of exposure. These are the cases that try the health officers. For example, a report reaches the office that a child has broken through quarantine, and probably would be found in the street playing with other children. A visit is immediately made, and the parent or guardian is asked by what right he has violated the regulations. We are immediately met by the state-

ment that the child is not sick, has not been sick; and sometimes, I am sorry to say, their statement is verified by that of the family physician, that he has examined the child and could find no evidences of the disease. What are we to do in this case? Examination is made. If any membrane is found, we make short work of that case by reporting the facts to the board; and probably an order issues for its removal to the hospital. But, if on examination we find the case is probably two weeks old, and no clinical evidences of the disease, a culture is taken and referred to the bacteriologist. The report is anxiously waited for, and it comes that the child has diphtheria. What, then? I am free to confess that in the majority of these cases after talking with a parent or guardian, showing them the danger to themselves and their family if the child is not isolated, they cooperate with us; and, if it cannot be properly isolated at home, they acquiesce in the removal to the hospital. But sometimes unfortunately we meet with people who have opinions of their own and are willing to defend them. What, then? If a child will not be isolated by the parent or proper guardian, what are we to do? That is a question for the bacteriologist. Can the bacteriologist tell us, "Is that child in his present condition dangerous?" — is that child a source of danger to the community? If he is, then we will remove the case to the hospital. But, when the culture is sent to the bacteriologist, and we learn that the child has bacilli of diphtheria in its throat, we want him to add that those bacilli are virulent and can do damage. If he can, our way is clear, and we can proceed.

I can tell some of the gentlemen here who have asked about the removal of cases that we have been at that work this winter. Cases where we have never been in doubt we have removed to the hospital; but, as I said before, we do meet with some cases and we do meet with some people that cause us anxiety how to proceed. There was a case that occurred in Dorchester where a child had been sick for over a month with nasal diphtheria; and, as usual, a report reached the office that the child was out playing in the street. I was sent to investigate the case. I saw the mother, and asked her why the rules and regulations provided for this class of cases had been violated. She told me she had a physician, and that she thought the interest of her child demanded sunlight and fresh air, and that we were doing wrong to quarantine that child any further.

Now, that was a case where I thought the bacteriologist's place was to assure us at that time as to the virulence of that diphtheria. If it was virulent, then we would quarantine the child. If not, I think we should be doing an injustice toward the child as well as an injustice to the community and to the family.

THE CHAIRMAN.— Dr. Rogers.

DR. O. F. ROGERS.—Mr. Chairman, I thoroughly appreciate the privilege of being present and listening to this exceedingly interesting and instructive discussion of the subject. I approach it as a general practitioner, and not as a bacteriologist. The result of such cultures as I have been able to make in the last fourteen or fifteen months has been to establish in my mind the value and the accuracy of cultural diagnoses. At the same time it has confirmed in my mind very strongly the belief that the diagnosis of most men, the clinical diagnosis, is in most instances accurate. The percentage of error is rather small. My errors have been of two sorts. I have mistaken mild diphtheria, in a few instances, for tonsillitis, but the percentage is exceedingly small; but it is sufficient to warrant me in coming to the conclusion that it is the duty to-day of every man to make a culture in every case where he sees a deposit of any sort or kind in the throat. I am aware that it throws a large amount of labor upon physicians to report the facts to the board of health; but it can be done without any expense to themselves, and I believe the best interests of the public demand that this should be done. I confess that I am not always in the habit of doing it, but I certainly shall endeavor to do so in the future. I am quite sure that no man, no matter how accurate he is, can always say whether a given case is diphtheria; and the errors that he will make will be in the way of overlooking and calling diphtheria something else. Everybody has seen instances of that sort. There is another error of diagnosis which is on the side of safety; that is, mistaking the streptococcus throat for diphtheria. I do not know of anybody that knows whether or not a streptococcus throat is infectious, or, if so, to what extent it is infectious. I, certainly, for one, would not want the streptococcus grafted on to my tonsil or placed in my mouth on the chance that there might be an abrasion, in which case I am quite sure I should be in very great danger of having streptococcus throat. It has happened to me several times to make a diagnosis of diphtheria, because I found a membrane which had travelled off the tonsil toward the roof of the mouth to the anterior pillar, and on to the posterior wall of the pharynx, which seemed to warrant me in declaring the case to be one of diphtheria; and I think in three cases, perhaps more, I have reported them without waiting for the cultural diagnosis. You can imagine my surprise when the word came back that the bacilli of diphtheria were not found. Now, in such a case, I shall stand to my diagnosis. Not that I doubt for a moment the truth of the statement of the bacteriologist. I have the highest respect for that, but as a measure of self-protection, also as a measure of protection for other members of the family, I shall insist upon that card staying there; and as long as the board of health does not take it upon itself to say it is not a case of diphtheria because it has received a report from its bacteriologist that the case is not diphtheria, and takes down the card, it won't come

down until I see fit to have it, which will be when the membrane has absolutely disappeared, and I have made some more culture, and the culture has shown no Klebs-Loeffler or streptococci present. These cases all got well, and yet three of them were very severe cases. When we look at them, and consider that they have considerable constitutional disturbance, perhaps the membrane extends clear to the end of the tongue, the corners of the mouth, the nose, the lip, the conjunctiva, and grows on every abraded spot into which it is rubbed, one asks, "Why should not that child be quarantined?" He ought to be. And yet the bacteriologist says it is not diphtheria. If the board of health saw fit to interfere, it would put the doctor in a bad place; but they do not do it, fortunately. It would be very desirable if some authoritative statement could be made in regard to whether or not such cases are infectious, and to what degree they are infectious, whether or not the card is rightly up in such an instance.

Then as to the differences between the clinical diagnosis and the bacteriologist's diagnosis. Occasionally it has happened that I have used anti-toxin (in fact, I now always use it that way, if I use it at all) before I get my report from the culture. Now, if I do use anti-toxin, and it turns out I have not diphtheria, then I am in a double hole. I have used anti-toxin, and I have got a card on the house; and the bacteriologist says there is no diphtheria. Well, the only way to do is to stand to your guns, and declare that under the circumstances you are perfectly justified in doing it, as I believe every man is; and I believe also, if he has diphtheria, he is not justified in any event in not using anti-toxin in every instance. And, strangely enough, in cases where I have used anti-toxin, and there has been a streptococcus growth in the culture, the results have seemed to be beneficial. I know that, in saying this, I am perhaps going contrary to the wise men of the world; but what a man sees he sees.

In regard to negative cultures, when they first began to make them, some men in Dorchester were a good deal cut up because the report came back, "No growth." I suggested that they spit in the tube to see if that would not do something. [Laughter.] I do not know whether they followed the advice or not, but I know they do not come back as they used to. But it won't do to say, If a man touches the wire to the throat, something will always grow. I made sure of that in one case. I managed to pick off a piece of the membrane and applied it in the tube, and then got nothing. But the negative culture settles itself very easily. As men learn to make cultures, I am quite sure there will be less and less trouble.

THE CHAIRMAN.—I should like to ask Dr. Rogers how he dealt with the family when he got the card up, and found a negative culture.

DR. ROGERS.—I told them that they had not the Klebs-Loeffler diph-

theria, but a streptococcus diphtheria. [Prolonged laughter.] Up to date it has always floored them.

THE CHAIRMAN.—There is time to continue the discussion briefly.

DR. PIERCE.—Mr. Chairman, it seems to me that the bacteriological examination and clinical appearances should be brought much nearer together than they are at the present day. I speak of that because it has been admitted that we do find diphtheria bacilli in perfectly healthy throats. If that is admitted, it brings me down to a question which I would like to ask, as in case of a child whose throat contains diphtheria bacilli upon bacteriological examination, and that child has no clinical appearances, is perfectly well and about the streets,—whether the board of health is justified in isolating that child, though he is perfectly well himself; whether, because he is able to communicate to others, he should be isolated. Is the board of health under such conditions justified in removing that child to the hospital, forcibly removing him?

THE CHAIRMAN.—I am sorry the lawyer has gone, because we need more legal advice on this question. We want the lawyer to tell us when the responsibility of the attending physician begins and when it ceases. The statute law says that, when a physician knows of a case of contagious disease, he shall immediately report it to the board of health. I certainly hope that physicians will not be led to give up the evidence which clinical observation gives them, however valuable we think the evidence from the bacteriologist is; and we all allow it the highest place. I hope the physician will continue to respect the clinical evidences and his responsibility under the law to report cases as soon as clinical observation will warrant.

The hour being late, I will call on Dr. Ernst to close the discussion.

PROF. H. C. ERNST.—Mr. Chairman and gentlemen, I have, as well as I am able, written down the points that seem to me to require reply as they have been brought up. Dr. Swarts has begun by expressing a very strong feeling in preference of the swab over the wire for obtaining cultures. Of course, that was true when the method began. The swab is much easier to use, and I recognized that fact when we began to use the wire. I also recognized the fact that the swab had been used very much more than the wire; but, before we decided upon using the wire, we had been carrying on experiments for a year in regard to the comparative accuracy of results as obtained with the swab and with the wire, and I know of no place where those experiments have ever been carried on excepting by us, and we found unquestionably that the results were very much more accurate, as far as the

discovery of the existence of the bacilli of diphtheria is concerned, if the wire were used than with the swab. It did require a little more learning on the part of the physician; but it seems to me, on the whole, the general profession in this community are using the wire with quite as much ease as the swab. Our outfits have been carried to Germany in two instances this summer with a view of introducing precisely the same methods there, both in Hanover and in Hamburg. All the testimony that I have been able to get is this: that this outfit for the general purposes is as complete as has been suggested. I meant to have asked Dr. Swarts also how many cases a day came to his office for diagnosis.

In regard to the use of the telephone, as can easily be seen, if we should undertake to telephone our results (and we usually average 35 or 40 a day), it would require a special telephone and special service, besides giving a chance for its inaccuracies.

He asked a question also as to the possibility of a snap diagnosis from a swab as rubbed over the throat, and then a microscopic preparation made. In answer to that, I must say I should be absolutely sceptical of the results. That method of diagnosis has been wholly abandoned in Paris, and I have never seen any reason to rely upon it at all in this country. In fact, I think Dr. Williams at the City Hospital showed that it was unreliable.

I meant to have spoken in the first place in regard to our methods of staining. We use, of course, Loeffler's Alkaline Methylene Blue; but we have also found that "Hunt's" stain is extremely effective in doubtful cases.

The question of the virulence of the bacilli in the throats of healthy persons has not been very accurately and extensively worked out. As far as the evidence goes, the virulence of bacilli in the throats of healthy persons, persons who have had no symptoms at all, is probably small. The investigation, however, is being carried on; and some time during the coming year we hope to have very effective results from the work that is going on at the Children's Hospital.

With reference to what Dr. Smith said, it is perfectly true that any negative results are to be taken with a certain grain of doubt under ordinary conditions; but given the conditions of this method of diagnosis, given the thousands and thousands and thousands of examinations that have been made, it seems to me that experience shows very clearly that we can place much more reliance upon cultures made with proper precautions than would be the case without this experience. So that personally I have grown to put a great deal more confidence in a negative result I have obtained than I should have had two years ago. It seems to me that all the evidence tends to show that this method of diagnosis is more accurate as regards the results obtained than is the case with the microscopic examination for the bacilli of tuberculosis, or is the case with testing for albumen

in the urine. If we are to rely upon these, we certainly are justified in relying upon this cultural diagnosis.

The length of time of the disease is emphasized on this new blank, so that that point is covered.

Then Dr. Smith also thought we should obtain less negative results by using the swab. I have the impression that he means less negative results as regards no growth at all, not less negative results as to the presence or absence of diphtheria from the swab; and that, of course, is perfectly true. But the whole point of the observation in regard to the use of wires is as to accuracy of obtaining the bacilli and the distribution along the surface of the nutrient media, so that, when the bacilli of diphtheria are present, they will have an opportunity to grow, and not be overwhelmed by the masses of other bacteria that are likely to be taken up by the swab.

In reply to Dr. Shea as to the virulence or non-virulence of the bacilli persisting in cases that have recovered, the evidence tends to show that they are non-virulent. I mean in cases where the diphtheria symptoms have disappeared, and bacilli are still persistent in the throat. Of course, no positive statement can be made in regard to it; but the evidence shows that or tends to show that.

I do not know why Dr. Rogers should have any hesitation in feeling that the streptococcus in the throat is an extremely infectious one. It is unquestionably so; and, if anything has been determined in this method of examination, it is that these cases of streptococcus in the throat are just as infectious as cases of ordinary diphtheria. The point of emphasis is that it may not be far in the future before the board of health has a new form of card, using the expression "a streptococcus throat," or some similar thing, where the culture diagnosis shows the absence of diphtheria bacilli. The difference so far as the clinical evidence shows — that has been gathered not only in our City Hospital, but elsewhere — is that streptococcus infection does not, as a rule, produce the severe symptoms, and it is not as a rule as malignant in the percentages of mortality; but, of course, the separation of this disease from true diphtheria is not exact, and we have not a great deal to go upon. In an article which I wrote upon diphtheria some years ago I made the distinction between true diphtheria and other affections that resembled it clinically.

Of course, every person who asks the question of me receives the advice to use anti-toxin without waiting for the bacteriological result. There is no question about that at all, and the board in its forthcoming report shows the wisdom of that absolutely. In general practice there is no death reported where the serum was used reasonably early. Anti-toxin does no harm. It has been shown that it can be used without producing any ill effect whatever; and, even if it is not a case of true diphtheria, the clinical

symptoms are a guide as to whether one should wait for the result of a culture or give the patient the benefit of the doubt — and the anti-toxin.

I know, as every bacteriologist knows, that the mere touching of the throat with the wire is not invariably followed by a growth. It may occur to any one, as happened to me only the other day, where I undertook to make a culture with the wire, that no growth followed the passing of the wire over the nutrient medium. And I think Dr. Rogers has had that brought to his attention before, that, when the cultural diagnosis first began, it was apt to be found that some antiseptic had been used in the throat, and that was the reason there was no growth.

As to the virulence of the bacilli occurring in the throats of healthy persons where there are no symptoms at all, I think Dr. McCollom's experiments show very perfectly that, unless a patient has been exposed to diphtheria and had a chance of carrying around the bacilli, that bacilli are not found. Dr. McCollom made a long series of investigations of the throats of healthy persons who had not been near, so far as he knew, a case of diphtheria, and never once found anything resembling bacilli of diphtheria. If bacilli are found, therefore, it seems to me the evidence shows that that particular person should be quarantined, at any rate for a time.

Now, the last point raised by Dr. Durgin, as to how much notice should be taken by the board of the positive results from the laboratory,—of course this question must be answered before a great while. I think Dr. Norton could give some information in regard to that of the case that occurred in Everett in the spring. A positive result was returned from the laboratory, and the physician refused to report the case as one of diphtheria. I do not know what the result was, but the Everett Board of Health took the matter in hand. It seems to me as if that was one question that must be settled.

These are all new points that are raised by this method of investigation : and, if there is any value in it, they must be carefully studied. It seems to me as if the evidence certainly is in favor of the value of the method.

THE CHAIRMAN.— We must bring this interesting discussion to a close, because I notice the authorities of the house are peeping through the small cracks to know when we are going to get through.

The meeting was then adjourned.

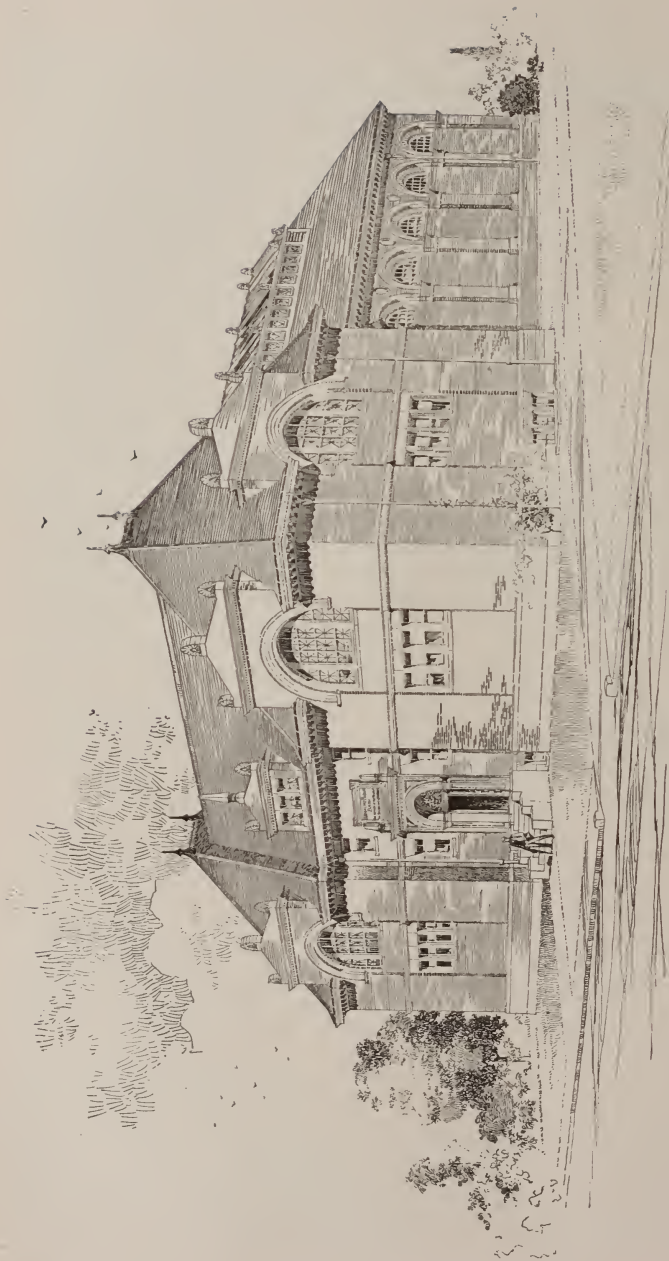
THE BROOKLINE PUBLIC BATH.



A MODEL PUBLIC BATHING ESTABLISHMENT.

Chairman Horace James, of the Brookline Board of Health, in his address of welcome to the Massachusetts Association of Boards of Health when it met October last in Brookline, stated that the town would consider in a day or two the question of providing improved public bathing facilities, and further expressed the conviction that the town would vote to have them. The town voted, as Chairman James predicted it would, to build according to the plans of the committee appointed in April, 1895, and appropriated \$40,000 for the purpose.

The location is the centre of population of the town, and adjoins the principal playground and the new High School. Certainly, the location is the best possible and the surroundings most congenial. The handsome brick building will contain a number of improved shower baths (the so-called "rain baths" of the German army) and a swimming tank 80 feet by 26 feet, lined on the bottom and sides with white glazed brick. There will also be a few bath-tubs, a plunge bath 22 feet by 10 feet, meeting-rooms, and other interesting features. The architect is Mr. F. Joseph Untersee, a resident of Brookline. We hope after the opening, expected in August, to give our readers a further account of this model American public bath. The importance of frequent bathing as a sanitary measure and the value to a community like Brookline, which has no water front, of a place where her school children will all be taught the healthful and life-saving art of swimming, cannot be overestimated. We heartily congratulate the progressive town of Brookline.



THE BROOKLINE PUBLIC BATH.

(From architect's drawing.)

THE AUTHORITY OF LOCAL BOARDS OF HEALTH OVER PUBLIC INSTITUTIONS.

The following extract from a pamphlet published at the Massachusetts Reformatory in Concord contains information which may prove useful to the boards of health of such cities and towns as contain public institutions or establishments within their respective limits.

A comparatively new question has recently arisen which will appear interesting to all local boards of health, since it relates to the authority which such boards may have over State or national institutions situated within the limits of the cities and towns. The Board of Health of the town of Concord recently submitted the following questions to the Attorney-General:—

(1) Has the Board of Health of the town of Concord authority to inspect the plumbing and drainage of that part of the Massachusetts Reformatory within the walls, or order changes therein?

(2) Has the said Board authority to inspect the houses occupied by the superintendent and deputy superintendent upon the front of the said prison building, or to order changes therein?

(3) Has the said Board authority to inspect the unattached tenements belonging to the said Reformatory and upon the land of the Commonwealth, and occupied by its officers, or to order changes therein?

(4) Has the Board of Health authority to make regulations concerning the keeping of swine by the Massachusetts Reformatory, and, if so, do we come under the regulation prohibiting piggeries to be within six hundred feet of the highway?

(5) Has the said Board of Health authority to order the discontinuance of the transportation of swill from the State Prison at Charlestown to the Reformatory piggeries?

(6) Has the town of Concord authority to demand that the dogs belonging to the Massachusetts Reformatory shall be licensed?

In replying to these questions the Attorney-General considered the subject at length, quoting decisions which had been made in other States on such matters, and summed up the questions as follows:—

The fountain of the police power of the Commonwealth is the legislature acting under the authority of the constitution. The legislature has seen fit to delegate a portion of this police power to local boards of health. Although this delegation is absolute in terms, it is not to be construed as exclusive of the authority of the Commonwealth or as against its public policy. It would certainly be against public policy to hold that a local and transient board should have greater authority over the property of the Commonwealth, cared for and controlled by the officers of

the Commonwealth, acting under direct authority of the legislature, than those officers themselves. It is much more consistent to assume that in the delegation of police power to boards of health there is an implied reservation as to the property of the Commonwealth which is specifically and fully provided for by legislation, and the care and control of which is committed to boards and officers established for that purpose and acting under the direction and authority of the legislature. Any other position is inconsistent with the sovereignty of the Commonwealth. It follows, therefore, that, although the delegation of authority to local boards of health is general in its terms, and purports to embrace all persons and property within the limits of the town, there is an implied exception of such property as is cared for and controlled by the Commonwealth itself, and under its special and peculiar jurisdiction.

I am of opinion, therefore, that your first three questions relating to the authority of the Board of Health of the town of Concord to inspect and order changes in the plumbing and drainage (1) of that part of the Reformatory within the walls, (2) of the superintendent's house, (3) of the unattached tenements belonging to the Reformatory and on the land of the Commonwealth and occupied by its officers, must be answered in the negative.

The same considerations, in my opinion, apply to the keeping of swine within the limits of the property of the Commonwealth occupied by it for the purposes of the Reformatory. It is unnecessary to decide whether the penal statutes of the Commonwealth, or even such provisions of the common law as have the force of penal statutes, are in all cases applicable to the officers of the Commonwealth. Many of them, obviously, are so applicable. An officer of the Commonwealth, even under the direction of the superintendent of the Commissioners of Prisons, may not commit felony or any other grave crime or misdemeanor. On the other hand, statutes relating to hours of labor and to fire escapes, and even the ordinary rules of law relating to assault, are inapplicable to the conduct of the Reformatory. It may be a question whether, if the officers of the Reformatory permitted a preventable nuisance to exist upon the land of the Commonwealth, such, for example, as a decaying heap of vegetable matter, a filthy and offensive piggery, or other source of pollution of the health of the neighborhood, they could not be indicted and punished for maintaining a nuisance. It is not to be presumed that the officers of the Commonwealth will direct or authorize acts which are in violation of the rights of the community; and, if such acts occur, it may well be that the court would hold them to be unauthorized, or, if authorized, that the persons in charge exceeded their own authority. So, if the keeping of swine should become, in fact, a nuisance to the extent that people residing in the neighborhood were endangered in their health, it may be that the persons in charge or responsible for such keeping would be liable to be indicted therefor as for a nuisance.

But this is a very different question from that which involves the right of the local board of health to prescribe an arbitrary distance from the highway within the limits of which swine shall not be kept. That is a local police regulation in which a limit is fixed for convenience, and under which the question of the actual nuisance does not arise. An offensive and unhealthy pig-sty more than six hundred feet from the highway could not be complained of under such a rule, while, on the

other hand, one that was clean, and in fact inoffensive, would still be unlawful within that limit. Even if the officers are liable for maintaining what is in fact a nuisance, it by no means follows that they are subject to the regulations of the Board of Health, with respect to the place where swine shall be kept, or that, in order to keep them, they shall be required to obtain a license from the Board. I assume that the keeping of swine is an incident of the business of carrying on the Reformatory, an institution which involves manufacturing, farming, and other industries, carried on under the exclusive jurisdiction of the State. For the reasons above stated with reference to the plumbing, I am of opinion that the rule of the Board of Health which prohibits the keeping of swine within six hundred feet of the highway does not apply to the land of the Commonwealth which comprises the Reformatory.

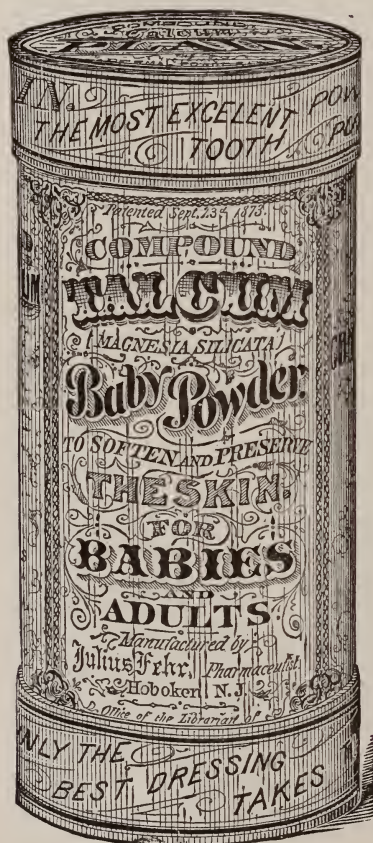
Question 5, relating to the right of transfer of swill through the public streets, stands upon a different principle. There is no exclusive authority over the streets of Concord conferred upon the prison officers. When they leave the property set apart for the uses of the Commonwealth and travel upon the public streets, they should be, and in my opinion are, subject to all reasonable regulations and laws, whether of the Commonwealth or of the town, or its officers, in regard to the use of such streets. And, if swill is carried by the officers of the Commonwealth through the streets of Concord in violation of the regulations of the Board of Health, I think the persons so offending may be persecuted and convicted; and that they cannot plead in justification any authority or direction of the officers of the institution.

The statutes of the Commonwealth (Pub. Sts., ch. 102) provide for the registration, numbering, describing, and licensing of dogs. This is a police regulation, made for the protection of the community. The license fee is not a tax. It is not authorized or designed for a revenue, general or local, but is in the nature of a license under a special police regulation, and is an exercise of the police power rather than the power to levy excises. (Desty on Taxation, 1404; *Blair v. Forehand*, 100 Mass. 139, 142, 143.) The object of the law may be said to be the identification and regulation of dogs running at large. There is, it is true, no exemption in the statutes of dogs which are not allowed to run at large; and it may be well that the legislature contemplated the possibility that dogs, which, although not beasts *feræ naturæ*, are yet less under subjection than neat cattle and other like domestic animals, would run at large. I see no reason why dogs kept by the officers of the Commonwealth, even though they be the property of the Commonwealth, should not be registered, described, and licensed; and, inasmuch as the fee is not in the nature of a tax, but for the registration and license, it should be paid as well in the case of dogs kept by officers of the Commonwealth or owned by the Commonwealth as in the case of other dogs. It would destroy the purpose of the law if any dogs were allowed to go at large unlicensed, and without the provision for identification prescribed in the statutes relating to the licensing of dogs. The Commonwealth, of course, may not be prosecuted for the keeping of an unlicensed dog; but whoever, whether a State officer or other person, keeps a dog, in my opinion, must have him licensed and pay the fee therefor, and is subject to the penalties of the statutes for failure so to do.

DR. JULIUS FEHR'S

"COMPOUND TALCUM"

"BABY POWDER."



THE

"Hygienic Dermal Powder"

FOR

INFANTS AND ADULTS.

Originally investigated and its therapeutic properties discovered in the year 1868 by Dr. Fehr, and

Introduced to the Medical and Pharmaceutical profession by Dr. Fehr, in the year 1873.

COMPOSITION.

Silicate of Magnesia with Carbolic and Salicylic Acids.

PROPERTIES.

Antiseptic, Antizymotic, and Disinfectant.

USEFUL AS A GENERAL SPRINKLING POWDER,

With positive Hygienic, Prophylactic, and Therapeutic Properties.

GOOD IN ALL AFFECTIONS OF THE SKIN.

Sold by the Drug Trade Generally.

Per Box, Plain	\$0.25
Per Dozen	1.75
Per Box, Perfumed50
Per Dozen "	3.50

THE MANUFACTURER,

JULIUS FEHR, M.D.,

Ancient Pharmacist,

Hoboken, N.J.

Only advertised in Medical and Pharmaceutical prints.

JOURNAL OF THE MASSACHUSETTS
ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

April Quarterly Meeting
1896

SUBJECT: The Duration of the Contagiousness
of Scarlet Fever

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are two dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

P.O. Box 2510, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. VI.

June, 1896.

No. 2

APRIL QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The April quarterly meeting of the Massachusetts Association of Boards of Health was held at Hamilton Hall, Salem, Thursday, April 23, 1896. In the absence of the President, Dr. Walcott, the meeting was presided over by Dr. Durgin, Vice-President of the Association.

At three o'clock the meeting was called to order by the Chairman, who addressed the meeting as follows :—

THE CHAIRMAN.—Gentlemen of the Association, it is always a regret to me to announce the absence of our honored President. He has duties this afternoon which have made it impossible for him to be present. There are conditions, however, attending our meeting this afternoon which offer a great deal of compensation: first, we are meeting in this most historic old city of Salem; second, we have with us, as a pleasing feature this afternoon, ladies to grace this meeting.

We are favored with the presence of the Chief Magistrate of the city; and I have the pleasure of introducing to you his Honor, Mayor Turner.

REMARKS OF MAYOR TURNER.

Mr. President, Ladies and Gentlemen of the Association, and Invited Guests.—It gives me great pleasure to welcome you to our city, and to thank you for the honor you confer upon us by your presence. I trust that your visit here will be a pleasure to you as well as interesting to us.

This is an important question you have come here to talk about to-day; and I know there are a great many here who can talk on the subject better than I can, so I will not intrude upon your time. I thank you for your attention.

THE CHAIRMAN.—The hour being late, we will dispense with the reading of the records of the last meeting.

The Secretary, Dr. Farnham, then read the following names of gentlemen recommended by the Executive Committee for membership:—

JULIAN A. MEAD, M.D., Watertown.
LEWIS L. BRYANT, M.D., Cambridge.
THOMAS F. HARRINGTON, M.D., Lowell.
WILLIAM H. PRESCOTT, M.D., Boston.
WILLARD S. EVERETT, M.D., Hyde Park.
ARCHIBALD ST. GEORGE, M.D., Fall River.
S. A. FREEMAN, M.D., Everett.

DR. GOVE.—I move you that the Secretary cast one ballot in favor of the election of these gentlemen to the Association.

The motion was seconded by Dr. Abbott, and was unanimously carried. The Secretary then cast one ballot in accordance with the vote, and the gentlemen named above were declared elected members of the Association.

THE CHAIRMAN.—Is there any incidental business to be brought before the meeting this afternoon? If not, we will proceed to the discussion of the subject, "When does the power to communicate scarlet fever to others begin and end with a scarlet fever patient, and what should be the minimum amount of care to prevent the extension of the disease?"

I regret to announce the fact that Dr. McCollom found this morning that it would be impossible for him to be present. I will call on Dr. Prescott, of Boston, to open the discussion.

REMARKS OF DR. PRESCOTT.

Mr. President, Ladies and Gentlemen,—The part of the discussion which is put down for me is the length of time that scarlet fever remains contagious. About two months ago Dr. Durgin asked me to look up the subject, and I entered upon the quest with a good deal of hope that I might find something to definitely make a dividing point at the time that scarlet fever ceased to be contagious. But I am sorry to say that that was not the result of my search.

There are two ways to decide upon the length of time that a contagious disease remains a source of danger. One is by finding the germ of that disease; and, as long as a patient carries that germ about with him, he remains a source of danger to the community. This germ has been found in some of the diseases, but it has never been found in scarlet fever; and so we must rely upon the second of the ways,—namely, clinical experience, which is, I believe, a very uncertain factor, because no one man sees enough cases to warrant him in saying just when the contagion ceases.

Some years ago it was thought that scarlet fever was not contagious in the beginning of the disease. But I think that is pretty well given up now. At any rate, the best authorities that I have been able to consult agree that scarlet fever is contagious as soon as the patient begins to feel indisposed.

Then the main point is, How long is it contagious? There is no way to tell definitely when the contagion of scarlet fever ends, and so it has to be decided by clinical experience.

A physician named Gibson, in Scotland, has put forward the doctrine that as soon as the fever is over and desquamation well established, if the patient is then given a series of baths, one or two baths a day, extending over a period of three days (not necessarily a bath of any disinfectant, but a hot bath with soap), and after each bath some vaseline be rubbed upon the patient, at the end of the third day the patient is free from the danger of carrying contagion or giving the disease to any one else, although desquamation has not yet ceased.

Dr. Gibson had the courage of his convictions, trying it for the first time in his own family, and no bad result came. And he asserts that in (I think it was) twenty years he has never seen any bad result come from this practice. But I think he and some of his followers are the only ones who take that ground. The majority of men believe that as long as the primary desquamation lasts scarlet fever can be conveyed to another susceptible person. Some go so far as to say that as long as there is any desquamation a case is dangerous. That hardly seems possible, because, if the germ of the disease be in the skin, and the whole skin has peeled and desquamation has ceased, as it does in certain cases after a few days, and then begins again and goes through the same process, it seems improbable for those scales to contain the germs of the disease. The majority of men, I think, feel that as long as primary desquamation is going on scarlet fever is dangerous. How long that lasts is a question the answer to which varies in each individual case. Sometimes there is no desquamation in cases where all the other symptoms would point to scarlet fever. Some authorities, on the other hand, say that those cases are not scarlet fever, that you cannot have scarlet fever without desquamation. But, if a physician be called to a case where all the clinical symptoms point to scarlet fever, and scarlet fever be reported, and a rule be made that no disinfection can be carried out until the ceasing of the desquamation that is supposed to follow each case, and if desquamation never occur, when are you going to have your disinfection?

Another point is the average time in which desquamation ceases or in which the case is contagious. In the report of the largest number of cases which I have found reported as having been seen by one man (an Englishman), 1,008 cases, the variation in the time of desquamation was from three to sixteen weeks. I do not think many people in America believe that the contagion of scarlet fever lasts sixteen weeks, but there have been such cases here. I saw one when I was in the City Hospital where the patient was admitted in November and was still desquamating in February, remaining in the hospital all this time because the ending of desquamation was the time at which a patient could leave the hospital. But the average time of desquamation is from five to seven weeks. I think in one series of cases, the best series I found, it was thirty-seven and a half days; and that was the time that Dr. Arnold found in Boston in the

last year in an epidemic of some thirty cases. But, of course, thirty cases make altogether too small a series upon which to make any definite report. Dr. McCollom, whom I asked about it and whom I expected to give his views here, told me that from six to eight weeks was the usual time, in his opinion, for scarlet fever to remain contagious.

It seems to me that, in the present condition of our knowledge of scarlet fever, we must consider the disease contagious as long as the primary desquamation continues. This is the position to which I have come, although, as it is founded upon nothing but clinical experience, it is therefore an opinion which is put forward only tentatively. As soon as the germ of the disease is found, we can tell whether the germ is in the desquamated epidermis or not, and whether it is necessary to continue isolation as long as desquamation continues. But, until the germ is found, it seems to me that it is necessary to keep up the isolation until desquamation is finished.

REMARKS OF DR. C. V. CHAPIN,
OF PROVIDENCE, R.I.

Mr. President, Ladies and Gentlemen,—Scarlet fever seems to belong to that class of diseases concerning which we have to do a great deal of guessing at the present time. I am very much at sea in regard to the contagiousness of scarlet fever; that is, as regards the length of time that this disease is contagious. I think, until we find that specific organism which Dr. Prescott has hoped we might, we shall have to continue to guess. I do not believe that by clinical evidence we can ever determine accurately the duration of contagiousness in this disease. It has seemed to me, however, from what I have seen, that scarlet fever is the most contagious in the very beginning. I believe that as soon as the patient is sick the disease is from that time contagious, and I think the first few days are the period of the greatest contagiousness. It is, of course, quite difficult to prove this. In fact, we cannot at present settle any of these questions. We only have evidence which looks toward it.

I tabulated quite a large number of cases, some eleven hundred secondary cases, occurring in families; and I tabulated them according to the time at which the patients came down,—the number of

days after the first case in the family. Of course, as I said, that does not prove anything, because it is likely that quite a considerable number of these secondary cases were contracted from the same focus that the first case in the family was. But I found that, out of 1,181 secondary cases, 141 occurred on the day following the first case, and that 554 of the 1,181 secondary cases occurred during the first week. Now, that would indicate that it is contagious in the early stages, and very contagious in the early stages.

As regards the duration of the contagion, since, as we cannot prove how long it lasts, we have got to fix some arbitrary rule to go by, some rule which seems to agree best with the data which we have at hand, which we must acknowledge are defective. Now, it is generally held that a patient is contagious as long, at least, as the primary desquamation continues. I have never been able to find any very good evidence to show that the contagiousness of scarlet fever lies in the desquamation at all. Yet it is quite possible, it is perhaps probable, that it does so; and it is certainly true that the contagiousness of the disease does continue approximately during the same length of time that desquamation continues. Now, the period of desquamation, as has been said, varies very greatly. I have seen cases which, as I believe, did not desquamate at all; and I have seen others which got through desquamating in ten days to a fortnight, and I have seen others which continued desquamating for a great many weeks,—never for so long as sixteen weeks, however, I think. I find that the great majority of cases in Providence get through desquamating under five weeks; and we have made it, in Providence, our rule to have isolation continue five weeks, or until desquamation shall have ceased. Whether that is right or not I do not know. As I said, it is guess work. But that is as near to it as we can guess.

I have tried to get at the period of contagiousness of scarlet fever in another way; and that is by considering the cases where scarlet fever appeared in a house containing more than one family; where it appears in one family, and later it appears secondarily in another family. I have tabulated 103 such cases according to the time in which the disease appeared in the secondary family. 28 of them were invaded in the first week, 19 in the second, 11 in the third, 17 in the fourth, and 28 in the fifth week or later. Now there are, in all these cases, a great many factors to be taken into consider-

ation. We are never sure whether the contagion comes from the person who was sick, or from the clothing or books or playthings or something else, which were infected by the patient, and which were not disinfected. That is one very serious difficulty we labor under in considering this matter of contagion. So that, when scarlet fever appears in another family in the fifth or sixth week after it has appeared in the first family in the house, we never can be sure that it was the sick patient that carried it downstairs. We do not know but that it was a toy or book or an article of clothing or something else, which had not been properly disinfected, so that we cannot, in this way, do more than guess at it. But it seems to me that, so far as we can determine with the best guess that we can make, we should have isolation maintained for certainly five weeks under all circumstances, and, if desquamation continues, for a longer period than that. And it is certain that this rule will not cover all cases. It is certain that some cases will carry contagion even when they have ceased desquamating, and when a longer time than six weeks has elapsed. We had a young man who was at college at Harvard, and was taken sick with scarlet fever and went to the hospital in Cambridge. He was kept in the hospital until he was through desquamating, which was the sixth week; and the case received certainly very close care there, and he certainly did not come away until he was entirely through desquamating. He had an entirely new suit of clothes. Everything that he wore came out of the store. And he had a thorough bath, including his head. Every part of him was cleansed as thoroughly as possible. He came home; and in two or three days his sister contracted scarlet fever, and died. A short time ago a little girl was discharged from our hospital in Providence between the fourth and fifth week. She was entirely through desquamating. There was not the slightest trace upon her. All the clothes she wore away from the hospital had been disinfected by steam heat. She went to her house, and within forty-eight hours her little sister was taken sick. These, however, are exceptions. Of some 60 cases which I have known, which have been treated in our hospital, and which were kept there until desquamation had entirely ceased, on their return home, although they were exposed to susceptible children, there were none, with this one exception, who contracted the disease from them.

In regard to the question of inunction, as practised among the

Scotch, I was very much impressed some years ago by the account which Dr. Prescott has spoken of,—so much so, that I tried to get that practice carried out in Providence ; and it was followed in a considerable number of cases. I have records of 682 families. I felt that inunction was very thoroughly carried out ; and I found that in those cases where inunction was practised the disease spread to other members of the family in 57 per cent. of the cases, while in those families in which inunction was not practised the disease only spread in about 54 per cent. of the cases, showing that in Providence, at least, where inunction was practised, where the patient was kept thoroughly anointed, there was not the slightest tendency noticed to check the spread of the disease.

The degree of contagiousness of scarlet fever is a matter of considerable interest ; and I have tabulated several thousand cases which have occurred in Providence (some 3,600), showing the degree of contagiousness in the family,—showing, if one child in a family has scarlet fever, what the chance is of the other children in that family having scarlet fever. We have shown that in Providence the chances are that a little over 50 per cent. of the children in a family will have scarlet fever if that disease once invades that family. The susceptibility varies very greatly with different ages. It is greatest from the close of the second to the close of the seventh year. At that time I found that, if scarlet fever invaded a family of children, 65 per cent. of the children of that age are liable to have the disease.

In regard to the protection afforded by one attack of scarlet fever, I have collected a great many cases, though I know the data in regard to those are not very reliable. It is hard to know whether a child has really had scarlet fever before or not. But, taking the cases as they are reported, I find that the children who have had one attack of scarlet fever are quite likely to have another ; that about 13 per cent. of the children who are said to have had scarlet fever before, when exposed to the disease a second time, will contract it. And I find that of adults a certain proportion who are said to have had scarlet fever,—I think something like 2 per cent. of those who were said to have had scarlet fever in early life,—when again exposed to the disease, will contract it. Age appears to offer greater immunity than a previous attack in scarlet fever. Adults are not susceptible to scarlet fever,—not nearly so susceptible as children,—about 6

per cent. contracting the disease when exposed. From the sixth year liability to the disease diminishes, and the liability of an adult contracting scarlet fever is less than the liability of a child contracting it who has had a previous attack.

REMARKS OF DR. ABBOTT.

I do not know, Mr. President, that I can add much to what has been said on this subject, except perhaps to say something about the English belief at the present time. The English authorities are paying a great deal more practical attention to contagious diseases than those of most of the continental countries. They have made greater provision for their care. With about four hundred and fifty contagious disease hospitals now existing in England, they must have much experience upon this subject. About two years ago Dr. Thursfield, of England, a quite noted authority, one of the medical officers of health, expressed his opinion, in the direction in which Dr. Chapin has to-day, that we have attached too much importance to desquamation as the infective material in scarlet fever, and not enough importance to other points. I find that this opinion is confirmed by some other English authorities at the present time. It is certain that we may have scarlet fever without desquamation, and I have no doubt it may occur without even eruption. Undoubtedly there are many physicians here, who have had considerable practice among children, who have had cases where simply a blush appears on the nose, and even cases without any eruption whatever.

There is a great deal of uncertainty attached to the methods of its spread and as to the mode of finding them out. Clinical evidence is important, but we do not know really what the clinical evidence is. The house itself is undoubtedly often the infective point rather than the person. Little as we know now about house disinfection, and with the uncertainty about the methods of house disinfection, there is certainly much that attaches to the room itself and to the house itself, so that it is impossible to distinguish between the person and his residence, as to which has infected other persons.

I would like to read just a few lines from one of the best present authorities in England upon this subject, because he lays down the principle as to time so carefully—not dogmatically, but with a great deal of care—for each one of the infectious diseases. And all of the

persons here who are connected with local boards of health would do well to have this book as a part of the local board of health library. The subject of it is "Infectious Diseases: Notification and Prevention," by Dr. Louis C. Parkes, of London.

In this manual he states the infective period of scarlet fever as follows: "From the earliest appearance of symptoms (usually sore throat) until all desquamation has ceased. The acute stage of the fever, when the sore throat and rash are most highly developed, is at least as infectious as any period of the desquamative stage. Doubt exists in the minds of some qualified to judge as to the infectiveness of the later stages of desquamation (on the hands and feet only), where convalescence is well established. It is safer, however, to assume that risk of infection still attaches to all cases which have not entirely ceased desquamation."

With reference to certain sources of infection, he adds, "There is no evidence that scarlet fever has been spread from scarlet fever hospitals as a centre, as is known to be the case with small-pox hospitals."

And, when he says "hospitals," he does not mean by persons going out of hospitals and spreading infection, but he means by its passing through the air from hospitals to surrounding localities, as was believed to have been the case in the Fulham Hospital, London, in the case of small-pox. It was pretty conclusively shown that small-pox did spread through a large district in London, and that the largest relative number of cases was within a ring of a quarter of a mile nearest the hospital, the next largest number in a ring of half a mile, the next in a ring of three-quarters of a mile, and so on. But scarlet fever has never been known to be distributed by a contagious disease hospital through the air.

REMARKS OF DR. THOMAS B. SHEA,
OF BOSTON.

Mr. Chairman, Ladies and Gentlemen,—As regards the contagion from scarlet fever, it has been commonly held that the power of contagion is greatest in the beginning of the disease, and practically before the rash has disappeared. Against that we have the clinical evidence that we obtain from the medical supervision of our schools

that it is not an uncommon thing sometimes to find probably three or four cases coming from one particular room ; and, after investigation, we find that a child had the scarlet fever and returned to school before desquamation had ceased, with this result,—that that child had probably infected the children sitting around his or her immediate neighborhood. That, to my mind, is one very strong argument to prove that, while the child is desquamating, there is still a danger that the child can carry and give this contagion to others.

I think myself that this whole subject, as Dr. Prescott has well said, is open for discussion. We have not anything definite, and will not have anything to stand upon until the germ, or whatever is the cause of this disease, is isolated.

REMARKS OF DR. JAMES B. FIELD,

OF LOWELL.

What I am going to say does not bear directly upon this question. A few years ago, when there was scarcely any scarlet fever in the city of Lowell, I had four children taken sick in one family. I wondered where the scarlet fever came from. On inquiry I found that the fifth child of that family had been ill with scarlet fever a year previously, while visiting another city. Through some mishap a dress which the mother wore while nursing this child was not disinfected. A year afterward she unpacked the trunk in which that dress was contained, took it out, and the children played with it, and put it on, and they all came down with scarlet fever. I have no doubt they got the fever from that dress.

Another point I have thought of. I remember a member of this Association who, when a house physician in a hospital where contagious diseases were always present, never thought of scarlet fever, as regards himself, until he was run down from another cause ; and then finally he took the disease, although he had probably been exposed fifty or sixty times previously.

The question which is under discussion was brought up forcibly in Lowell a short time ago. A young physician who had studied abroad stated to the board and to his patient that scarlet fever on the first day was not contagious, and that we needed to adopt no precaution when removing the patient to the hospital. We did not agree

with him. I am sure that all of us here to-day are very glad to have been able to hear what Dr. Chapin and Dr. Prescott and Dr. Abbott have said. If this is guess-work, they have enabled us to guess a little more closely; and our duties as members of boards of health will be to say something like this: "Whether scarlet fever is contagious for a certain length of time or not, we know it is the safest to regard it as contagious from the time a patient begins to be sick until desquamation ceases."

Some years ago in Lowell we adopted the rule that we would take no placards from off a house — that is, we would not release a patient from quarantine — until the patient's physician said that desquamation had ceased. Soon afterward we got a card from a physician upon the third day of the disease, stating that, in his opinion, desquamation had ceased, and that the patient was well. Under this rule we continually got cards during the first week of the disease. So, finally, we established a rule that no card should be received from a physician stating that desquamation had ceased until at least four weeks had elapsed from the beginning of the disease. I wish that the rule read five weeks instead of four weeks.

THE CHAIRMAN.—I am led to say, from the remarks which have been made concerning the time during which a scarlet-fever patient should be compelled to remain in, that in Boston we were able to deal perhaps more justly with the patient by utilizing the fifty physicians whom we use in inspecting schools to see every one of those patients before his discharge. It is their duty to see, before the patient is discharged, that every particle of desquamation has ceased. This they certify to the Board of Health before a permit for release is issued. In this way we let the patient, who may recover fully in two or three weeks, have the benefit to which he is entitled.

Are there others who would like to say a word on this subject?

REMARKS OF WILLIAM H. GOVE, ESQ.,

CHAIRMAN OF THE SALEM BOARD OF HEALTH.

It may be well enough to say a word about the reason for selecting this subject for consideration on the occasion of the meeting here, as the selection was made at the suggestion of the Salem Board, which has watched the progress of the contagious diseases in its city with

considerable interest, as I suppose other boards have done, following it from day to day ; and I will call attention to a graphic delineation of the progress of contagious diseases that we have here, which can be seen on the table in the corner. Some time ago our efficient clerk, Mr. Newcomb, devised the plan of marking the spots where contagious diseases occurred on a map of the town by means of pins on the map. He kept the map in his office. He would use a black-headed pin for diphtheria, a red-headed pin for scarlet fever, a white-headed pin for typhoid fever, keeping those pins in the place on the map corresponding to the location of the disease from the time it was reported until the time the cards were taken down, so that any person going into the office could see just what the state of the health of the city in that respect was. At my suggestion, about a year ago he supplemented that with the familiar method of delineation by lines on a diagram to show the progress of these diseases, having one line for each of the three kinds of contagious diseases, and another line to show the total. And those for quite a number of months back have been brought in here, so they can be seen. Now, we have found all along that the great bulk of our contagious cases consisted of scarlet fever. We had a very serious epidemic of diphtheria some years ago, which alarmed the city extremely ; and we were in danger of a renewal of it at another time, but it was kept within reasonable limits. Since the large amount of discussion which has been had in regard to the use of anti-toxin and our employment of it here wherever we could get it employed, we are not quite so much in fear of diphtheria. At all events, it has been kept down within very small limits comparatively. All cases where there was any reason for doing so, we have adopted quarantine for ; and we feel that we are handling it, and have been for some time past, with a very reasonable degree of success.

Typhoid fever, of course, does not give us the apprehensions that the other diseases do. But scarlet fever is something which we do not feel that we have been handling successfully. We have a large number of cases all the time, and it spreads from one location to another. We have been fortunate in having a mild type of the disease usually ; yet, last year, we had two or three very malignant cases, speedily fatal. We know what the disease is capable of becoming, and it gives us a great deal of apprehension to find we do not make

any more progress with it. And we were hoping that, by bringing the matter up here, we might learn something about it which would enable us to make something like the gain which has been made in diphtheria.

The state of things at present is indicated on that map. Our contagious diseases are diminishing. We have a little less than 35,000 inhabitants here in Salem; and we have an unusually small amount of contagious disease, and it is diminishing. Our map shows 24 cases, I think, of scarlet fever and 2 cases of typhoid, no diphtheria. The proportion perhaps does not show quite so great a predominance of scarlet fever all the time, but it is indicative of it. We do not feel that we are handling it satisfactorily at all. And we do not know how to do it. I am a little inclined to think, from what I have heard here to-day, that nobody knows how to handle it very satisfactorily; but, if we can make a little gain, we shall be very glad to do so, and that is why this was selected as the matter to be brought up for discussion.

DR. J. S. NORTON, of Everett.— May I ask a question?

THE CHAIRMAN.— Certainly.

DR. NORTON.— I should like to ask, in Boston, in a case where there was very slight desquamation, and the child had been examined by the physician, would that case be let out of quarantine within two weeks, say, of the time that it was first reported?

THE CHAIRMAN.— As soon as the case is reported by the attending physician, it is placed in isolation. It is not released from isolation until the district physician, who is our agent, reports the child ready to be released.

REMARKS OF DR. NORTON.

Mr. Chairman,— It is in that class of cases that we have had the most trouble in Everett; that is, those who have very slight desquamation, and the people are anxious to get the child out. I had one of my own cases, where we fumigated the house; and, I being on the Board of Health, I looked after the fumigating end, too. And within twenty-four hours of fumigation a second child came down. The first child apparently had entirely done desquamating, and had had a thorough bath and all that. And we have had other cases, I think one or two others since then, where we would release from quaran-

tine at the end of desquamation, when it occurred within, say, less than three weeks, and another child would be taken down within a day or two. So now we begin to think it is best to keep them in four weeks, no matter when the desquamation ceases.

THE CHAIRMAN.—It is not infrequently the case that an attending physician will distrust his own diagnosis; and, either by the importuning of the family or from some other cause, he will report to the board of health that the child probably did not have scarlet fever. In such a case we send a physician from the board to make as good a guess under the disadvantages as he can. As a rule, in those cases of doubt we insist upon disinfection after such time as the physician or physicians advise the release of the child.

Are there other remarks to be made? Is Dr. Sargent present?

REMARKS OF DR. SARGENT,
OF SALEM.

I do not think I can add anything to the discussion that has already taken place. Being a young man, of course my experience would not be very extensive. But I was interested in hearing the different ideas which have been set forth as regards the time during which the disease was infectious, especially whether or not the disease was infectious at the beginning. As a comparatively young man in medicine, the impression I carried away from school and hospital is that the disease is very much less contagious at the beginning than it is during the height of the fever or during the early stages of desquamation. The idea that I got from a prominent teacher in the treatment of children's diseases was that the disease was practically not contagious in the early stages except by immediate contact or through the using of the same utensils as those used in a case which had just commenced, whereas the period of desquamation was the period of greatest danger. The opinions expressed apparently differ very materially from that idea. I think Dr. Rotch, of Boston, has the impression that the disease is much less contagious at the beginning than it is further along. Of course, that would be the idea of one man.

As to the best means of preventing the spread of the disease, it

seems to me that the contagious hospital offers the best solution of the problem which we have at present. Of course, in the smaller cities such an institution does not exist, for obvious reasons.

The methods of disinfection which we have at the end of the disease (as determined by clinical experience) it seems to me are imperfect. The use of sulphur, which I suppose is the most general means of disinfection at the end of the disease, is pretty thoroughly denounced as inefficient by bacteriologists in general, and particularly the use of sulphur without the presence of moisture. And so, until the direct cause of the disease, whether from germ origin, which is most probable, or from whatever cause, until such cause is determined, it seems to me that comparatively little progress can be made in the handling of this disease.

THE CHAIRMAN.—Are there any further remarks to be made on this question? I see we have a gentleman with us who has had a large experience as health officer in the city of Cambridge. Will Dr. Cogswell say a word?

REMARKS OF DR. E. R. COGSWELL,

OF CAMBRIDGE.

Mr. Chairman,—I am not prepared to say anything to-day, as of late years I have known but little of the subject. But I should like to ask whether the story I am about to tell is something I heard privately or whether it is known to somebody else. Not long ago I heard of a case where a child sick with scarlet fever was convalescent, and was allowed to write a letter to a young friend. So the child wrote the letter, and sent a choice selection of scales as curiosities in the letter.

Dr. Abbott looks as though he had heard it before. I should like to ask whether I have been trying to remember something I heard privately.

DR. ABBOTT.—I guess you read it in the *Medical Journal* about a month ago.

DR. COGSWELL.—Well, I should like to ask what the result in that case was.

DR. ABBOTT.—Oh, it was a distinct case.

THE CHAIRMAN.—Are there further remarks to be made?

REMARKS OF RAYMOND L. NEWCOMB, ESQ.,
OF SALEM.

It has occurred to me, as a layman, that time brings experience, and with it knowledge. I think a large percentage of the opportunity for spreading scarlet fever is occasioned by the indifference of the community to the danger, their indifference to the existence of a case of scarlet fever in a home, in a house, in a tenement especially. And the lower the class of life we find it in, often, at least, the greater the amount of indifference we find. A match can kindle a large-sized fire; and, as the strength of a machine is only equal to the strength of the weakest part of it, so are the safety and health and welfare of a community indicated by the indifference of its people. And I am free to say that indifference is frequently shown among classes of our people of whom you would expect better things. Some of them are really ignorant, others more or less indifferent. Others, again, assume by virtue of their social position to know all about it; and the board of health plays second fiddle oftentimes in regard to the care of a case and in regard to the point of disinfecting. And the result is that it brings it back to the point I started with, which is the indifference of the community. If we could educate the people to be as much afraid of scarlet fever as I think they are of small-pox, we could handle it, as boards of health, much more satisfactorily. But as long as the community will meet you, when, as an agent of the Board of Health, you go to a house, with such expressions as, "Oh, I ain't afraid: my children have all had it," we shall not make much progress. And when you ask the question, "Do you live here?" you are met with the reply, "No, I don't live here." "Well, where do you live?" "I live upstairs, or downstairs, or across the street." "Well, you ought not to be here." "Well, I know; but I thought I would come in, and help this woman." And then the woman you are talking to goes home to her household, and carries contagion. She says she is not afraid of it, but she imperils the lives of others.

It becomes a question, therefore, what to do to educate a community to such an extent that they will regard themselves as having a certain amount of responsibility in those cases. When that is accomplished, then we, as boards of health, can do a great deal more than at present. And, in concluding, I think I might say, hoping also that

others may agree with me, that our people are of course becoming more enlightened, and also, I think, to a considerable extent, more willing to co-operate with the boards of health. And I am glad to be able to say so. Of course, we do meet with some stubborn cases. But then, again, as a result of about ten years' experience in this city, I may say I think that we are meeting with better success than formerly, because I think the community are becoming enlightened. And I think it is largely due to two things. Of course, the efforts of the members of the boards of health are unceasing to educate the people by circular and by word-of-mouth information and by example, and also because they are becoming better informed. Among people here I have seen instances where they were very careless; but I have also seen instances where they have shown the results of admonition, and it has borne good fruit.

My particular point is the necessity for instilling constantly into the minds of the community the necessity for being vigilant themselves; and the principle, as I have said, is that the health of a community is only equal to the health of the weakest. Of course, diseases like scarlet fever and diphtheria lurk naturally among the filthy portions of the community more than among the cleanly ones. In one severe epidemic, in one of the best wards of our city, and in one of the better portions of that ward, some few years ago, trouble broke out among a portion of our population where, to tell them they were filthy, would have given them offence. But investigation by experts proved clearly that the plumbing was defective.

I do not know that I have anything further to add. I did feel like speaking on this one point of indifference, however. I am greatly obliged to you for your attention.

THE CHAIRMAN.—Are there any further remarks? I will take occasion to say that in the absence of more forcible invitations for the next meeting, I will, in behalf of the Boston Board of Health, invite the Association to meet in Boston in July.

DR. ABBOTT.—Between the time of this meeting and our next meeting the centennial of Dr. Jenner's first successful arm-to-arm vaccination occurs; that is, on the 14th of May, when he vaccinated James Phipps from the hand of Sarah Nelmes. And on this account many organizations have taken some such measures in other parts of

the world, particularly in Russia and in Germany, although little is being done in England.

I should like to introduce this resolution : —

Resolved, That, in view of the approaching centennial of the discovery and introduction of vaccination, the Massachusetts Association of Boards of Health takes this opportunity to express its renewed confidence in vaccination and revaccination, as constituting most efficient means for the prevention of one of the most serious of all infectious diseases.

On motion of Dr. Farnham the resolution was unanimously adopted.

On motion of Mr. E. L. Pillsbury it was voted that it was the sense of the meeting to extend to the hosts of the Association the thanks of the members and their appreciation of the courtesies extended to them by the authorities of Salem.

On motion of Dr. Cogswell the meeting was then adjourned.

NOTES.

The following circular has been sent to all the practising physicians in Brookline:—

OFFICE OF THE BOARD OF HEALTH,

BROOKLINE, MASS., April 24, 1896.

Dear Sir,—Recognizing the great value as a public health measure of an early and correct diagnosis in cases of suspected pulmonary tuberculosis, the Board of Health has made arrangements with Professor Harold C. Ernst for free bacteriological examinations, when desired, of sputa from such cases occurring in Brookline. Specimens may be sent direct to Professor Ernst's laboratory in the Harvard Medical School, to be received not later than 6 P.M.; or, if you so desire, they may be left for forwarding not later than 5 P.M. at Messrs. Young & Brown's drug store, where suitable wide-mouthed bottles for the sputa may be obtained. The best specimens for examination are those expectorated in the morning.

A letter or label should accompany each specimen, stating the name (or initials), age, and address of the patient, and whether the physical signs are well marked or not.

The name and address of the physician should also be given; and a report from the examination may usually, but not always, be expected the day after the sputum is received. Examinations of cultures from suspected cases of diphtheria are made early on the morning after they are received at the laboratory, and the reports are mailed about noon the same day. As every diphtheria culture has to remain in the incubator over night, the tubes will be taken from Young & Brown's drug store to the laboratory but once daily, at 5 P.M.

Yours respectfully,

GEORGE F. JOYCE,

Clerk of the Board of Health.

JOURNAL OF THE MASSACHUSETTS
ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

July Quarterly Meeting
1896

SUBJECTS: Removal of Cases of Infectious Diseases to the Hospital; Plumbing Regulations

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are two dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

P.O. Box 2510, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. VI.

September, 1896.

No. 3

JULY QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

A quarterly meeting of the Massachusetts Association of Boards of Health was held on the afternoon of July 30, 1896, at Gallop's Island in Boston Harbor. The meeting was called to order shortly after 2.30 P.M. by the President, Henry P. Walcott, M.D. The Secretary read the records of the annual meeting and the last quarterly meeting, which were declared approved.

THE PRESIDENT.—The Executive Committee submit to the Association as candidates for election to membership

DR. D. S. WOODWORTH, of Fitchburg.

DR. ELLIOTT WASHBURN, of Taunton.

THOMAS W. COOK, ESQ., of New Bedford.

The gentlemen above named were elected to membership in the Association.

THE PRESIDENT.—Is there any business which any member desires to bring before the Association at this time before proceeding to the programme of the afternoon? If not, your committee have

arranged for a short discussion of the subject, "Removal of Cases of Infectious Diseases to Hospital"; and I am informed that Mr. Gove will say a few words to the Association upon the subject.

REMARKS OF MR. GOVE.

Mr. Chairman, I am not prepared to say a great deal on the subject. One point to which it has been suggested that I should refer is the legal aspect of the question in regard to attempting to define with some exactness just what powers the boards may exercise, and in just what way they can carry out their right to compel removals in cases where they think it necessary. Of course, there can be no doubt that in suitable cases the boards have full power to compel the removal of cases of infectious disease, in order to prevent infection. The most familiar instance of this is the case of small-pox, in which it is almost always necessary; but we ought to know just what the limits of the rights of the boards are in other cases legally, — just how far they extend. I would not undertake to say anything about that without consulting authorities.

The first thing in regard to removal is to have a suitable place to remove the patient to. In our own city of Salem we do not feel that we are provided with a place which enables us to exercise this power to any considerable extent except in extreme cases where it is unavoidable; and our city being small, not being a place where it would seem to be justifiable for the city to go to the expense of conducting a hospital for that purpose alone, the desirable thing would be that the hospital which we have should have a building for contagious cases, and that the Board of Health should have the opportunity by arrangement with the hospital to send such cases there. If that could be brought about, so that we could send suitable cases where they could be better cared for, I think we could carry out that method to a very much larger extent than we do now to great advantage, because in a very large proportion of cases the conveniences for treatment and the means of isolation, to say nothing of the trust we are compelled to put in people who have the care of the patient, are very unsatisfactory; and it would be much better if the patient could be removed perhaps in the most of the cases. Of course, it is obvious that we should also have the advantage in most cases that is usually found

in hospitals, whatever may be the nature of the disease ; that is, that the patients get better care. But, of course, what we are most concerned about is the means of isolation ; and all the time there is a great deal of trouble in regard to taking care of this. And there is a great deal of difficulty that we have experienced in regard to the disease that we discussed at our last meeting,—scarlet fever,—where we have found that it is almost impossible to get people generally to take the precautions that they ought to. I suppose there would still be some difficulties, no matter what facilities were afforded, in determining exactly the line which should be drawn, what cases should be removed, and what should not. Where the patients and their friends do not object, there is less difficulty ; but, if it comes to a question of exercising pressure, there it would be very difficult to draw the line. But it seems to me if facilities were made ample, and the board should undertake the policy of removal to a hospital for better treatment and isolation in all cases where they thought it would be of advantage, the drawing of the exact line would take care of itself ; and all that it is necessary to do is to adopt that policy where it is practical, and follow it up right along. I think there could be a great gain made in that direction.

THE PRESIDENT.—Of course, as usual, we look to the large experience of the city of Boston in such matters ; and I will ask Dr. Shea to say something upon the subject of the practice in the city of Boston.

REMARKS OF DR. SHEA.

Mr. President and Gentlemen,—The question of the forcible removal of cases of infectious disease is one of daily occurrence in our department. Each and every case of scarlet fever and diphtheria is investigated and reported upon. The method in vogue is as follows : The city is divided into fifty districts. To each district is assigned a local medical officer. In cases of infectious diseases he is immediately notified. Within twenty-four hours he must report to the main office whether he approves or disapproves of isolation in each particular case. If he approves, he must still maintain a personal observation of that particular case until it is released from quarantine. If he disapproves of isolation, then the machinery of the main office is set in

motion. A visit is immediately made, the diagnosis is confirmed, and then the parent or whoever has the legal charge of the patient is asked to allow its removal to the hospital. If they consent, the ambulance is sent for, and the patient is removed. But, if we are met with a refusal, what then? In the first place, the advantages to be derived are fully set forth,—the advantages to the patient, the other members of the family, and to the community in general; on the other hand, the disadvantages, if the patient remains at home. All that is fully explained. If that is unsuccessful, the next step is to refer this particular case to the board for action. That report consists of this: the condition of the patient at the present time, the number of persons in that immediate family, the number of rooms occupied by that family, the number of persons in the building, the number of families in the building; whether or not it is a lodging-house, tenement house, or modern apartment house. All these facts are presented to the board, and likewise, and to my mind the most important consideration, the number of children that will probably be excluded from school if that patient remains there,—in diphtheria probably sometimes two or three or four weeks, and in scarlet fever three or four months. This report is immediately presented to the board, and they take action. If they decide to remove the case, an order is issued, directed to the proper officer, which reads that he will proceed to such and such a place, and remove the child at once, or whoever it might be, to the south department of the City Hospital for infectious diseases. That, in our experience, has generally been sufficient. The order is read to the parents. In the mean time the ambulance has arrived, and the patient is removed. But even with the order and the authority of the board, if they still persist in refusal, what are we to do? Well, we tell them that we are merely there to execute the order of the board, and to remove the patient. In a few cases there has been some violence attempted, but we have proceeded as follows: we have sent for a police officer, and he is told that all we wish is that he will preserve the peace. So far that has been sufficient. We take the patient, and he is sent to the hospital.

Since we have been engaged in this work cases have arisen where we have left a patient, and for this reason. For example, from the time of issuing the order to the arrival of the ambulance a patient

might be in a dying condition. Of course, that is sufficient for us to leave the patient. Again, another class of cases, nursing infants. The question immediately arises there about taking the child from the mother. They are very willing to have their child who is afflicted with diphtheria sent to the hospital, provided the mother can accompany the child; and we make a concession, first making arrangements with the superintendent of the hospital that this woman and particular case will have an isolated room there. The mother, as a rule, is only too willing when she can accompany it to the hospital.

But if, after making all these concessions, we are still met with a refusal, what do we do? Well, if it is a very aggravated case, we take possession of the tenement, and turn it into a hospital, get our own nurse; and we know then that at least the case is isolated. Another feature about the removal of these cases is this. We very often visit a case preparatory to removal to a hospital. We arrive there. Probably it is a tenement of two or three rooms in a tenement house, and a family probably of eight or ten, four or five children, and one sick. The statute says whoever is sick or infected with any contagious or infectious disease must be sent to some hospital set apart and designated by the Board of Health. The question is this: If a visit is made early in the morning or late in the evening, especially during the winter, we find probably in the kitchen a bed on the floor, a mattress, and a child sick with diphtheria, and on the same floor and same bed four or five other children. Would we be acting lawfully if we took not only the patient sick with diphtheria, but the other four or five children of that family, and send them to an isolated ward of a hospital, give them a bath, disinfect their clothes, keep them under observation a few days, and then send them home? Would we be acting lawfully? That is a question for our legal friends.

In the middle of winter we cannot put children on the street; but it is the only way, to my mind, that we can go into a tenement of two or three rooms, occupied by probably a family of eight or ten children, and clean that place up. That is a question that I wish some of our legal friends would discuss, whether we should be acting lawfully by taking not only the child afflicted with diphtheria or scarlet fever, but also if we took the whole family under those conditions, and sent them to the hospital.

THE PRESIDENT.—The city of Cambridge has had an experience in this matter ; and I will ask Dr. Farnham, the health officer of that city, to speak to us on the subject.

REMARKS OF EDWIN FARNHAM, M.D.

Mr. President and Gentlemen,—Immediately upon the passage of Chapter 511 of the Acts of 1894, which is an act entitled “An act to provide hospital accommodations for the care and treatment of persons suffering from contagious diseases in cities,” the Board of Health addressed a communication to the mayor, as required by the act, stating that such hospital was needed in Cambridge. A number of sites have been examined by the board, one of them eminently suited to the purpose ; and there the matter rests. We are, however, fortunate in having in Cambridge the Cambridge Hospital, to which we can send a certain number of patients, limited by the accommodations there, which are not sufficient for a city of the size of Cambridge, with a population now of 85,000. I think the isolation part there will accommodate, if it is filled, about nine patients. I think they had nine there last winter, either eight or nine at one time. That hospital the Cambridge Board of Health utilized last winter, and so far this year, when we discovered that we had spent all the money available for that purpose ; and a communication has been sent to the mayor, asking if he would authorize an appropriation of more money for the care of these patients which we think should be sent to the hospital, and stating that, if he would not, no more patients would be sent to the hospital by the Cambridge Board of Health this year. So until some answer is received from the city government of Cambridge no more cases can be sent to the hospital at the expense of the Board of Health.

The desirability of such a hospital it is unnecessary to discuss, certainly in an Association like this. I have asked the opinion of our legal member as to what I should do if a case arose where a person was unwilling to go to the hospital. His opinion was to the effect that I should get a warrant from two justices of the peace before I could take that patient.

THE PRESIDENT.—As this subject is one of very great and general

interest, I hope it may be taken up by the Association ; and I shall be very glad to hear from any member upon the subject, not only those who have had experience, but those who have any question to put to their fellows in this matter. I hope any member interested in the matter will address the Association.

REMARKS OF SAMUEL H. DURGIN, M.D.

Rather than have this question lag, I will say a few words by way of explanation. It was my intention to have the corporation counsel of Boston with us to-day, and have the law interpreted as clearly as possible for publication in the coming issue of the *Journal*, and with it a practical discussion of this work.

It must be conceded by every one who has had anything to do with the care of infectious diseases that it is extremely important to institute and maintain strict isolation ; and this in large cities, especially in the poorer quarters of the city, is practically out of the question, and the hospital becomes a necessity. I have reason to think that outside of a few of the larger cities the practice of removing these patients to the hospital is rarely put in operation : first, from the lack of hospitals in which the patient can be placed ; and, second, the want of experience or that information which the health officer needs, in order to make him feel certain that he is doing right. For it is not a very pleasant thing to remove a patient from his home against the wishes of the family.

As to the forcible removal of patients to the hospital. We have in Boston been obliged to remove patients forcibly with small-pox, diphtheria, and scarlet fever, in a great many instances. We have consulted the law department, and have been advised that, when the Board of Health passes an order issued to one of its agents to remove a patient, it is perfectly proper to remove that patient by force, if necessary, to the hospital. In cases of small-pox, if the patient is in a tenement or lodging-house, or where there is more than one family, and the attending physician and the Board of Health believe the patient is not properly isolated, but is able to be removed, we can take the patient to the hospital ; but in other cases than small-pox these conditions do not obtain. In case of resistance we have, as Dr. Shea has told you, called on the police to restrain people from

violence ; and our officers take the patient sometimes through the window, but always carefully, and with due regard for the comfort and safety of the patient.

REMARKS OF DR. B. F. DAVENPORT.

Mr. Chairman, I have had some experience in the small town of Watertown, with a population between eight and nine thousand, which may be of interest to the Association. The town until the last annual town meeting had made no appropriation specially to cover the expenses of quarantine for contagious cases. The question was raised as to whether, in such cases as we had hitherto sent by special arrangement to the hospital in the neighboring city of Newton, and paid the expenses out of the overseers of the poor fund, under the statutes the heads of such families were not thereby pauperized, and lost their franchise right to vote ; and it would seem to be so. Anybody who receives aid out of the public fund appropriated for the special care of the poor becomes a legal pauper. To meet that difficulty, the town, on my request at the last annual town meeting, made to the Board of Health the small additional appropriation of \$250, which we thought would be sufficient. We had, however, several cases of diphtheria ; and at the monthly meeting of the board it was found that the bills sent in by the Newton hospital for the first month more than exceeded our entire appropriation, and we were uncertain what to do. But the question which I wish especially now to speak of is the fact that where there is no especial appropriation devoted to this purpose in the hands of the Board of Health, and a poor person receives aid from the poor funds of the town, of course they are, under the well-known statute, paupers, and deprived of their franchise, or vote.

A MEMBER.—Would that be so if he went there against his will?

DR. B. F. DAVENPORT.—As I understand it, whoever receives aid from the public funds specially devoted to the care of the poor becomes a pauper, and all paupers are deprived of their franchise.

MR. BRIMBLECOM.—Mr. President, I would like to ask one or two questions, whether or not Boston has any special laws governing infectious diseases.

DR. DURGIN.—No, sir. We operate entirely under the general law.

MR. BRIMBLECOM.—I should also like to ask whether the board requires the forcible removal of a patient afflicted with an infectious disease from a house that is not a tenement house,—that is, one or two families.

DR. DURGIN.—In cases of scarlet fever and diphtheria you may remove them from any house; but the statute law requires that the removal shall not apply to small-pox except in cases of boarding or lodging houses, and where the attending physician and Board of Health believe that the case is not properly isolated.

MR. BRIMBLECOM.—Dr. Shea mentioned the fact that in cases where they did not remove the patient from the house they took possession of the house and used it as a hospital. What, may I ask, is the method of maintaining that as a hospital?

DR. DURGIN.—The statute law provides that, where a person is unable to be removed, the board has the right to make a hospital of the building and to remove people in the neighborhood. It is a singular provision of the statute law by which we are authorized to remove people from the neighborhood, but not from the house. It should read so as to authorize the Board of Health to remove other people from the house, for there is no need of removing them from the neighborhood. We have the right to take charge of the house and patient, and provide nurses, physicians, and provisions, and charge the expenses to the person or to the town or State, as the case may be,—to the person, if able to pay, to the town in which the person has gained a residence; but, if he has not any in a town, then the State pays the bill,—that is, all reasonable charges.

MR. BRIMBLECOM.—Do you prevent people from going in and out of that house by a police officer, if necessary?

DR. DURGIN.—Yes: the regulations or orders of the Board of Health concerning that house would be precisely as they are over a hospital.

DR. BRYANT.—Mr. President, I should like to ask if the price for the care of the patient is collected back from the other cities and towns or from the State Board of Health?

DR. DURGIN.—Yes, if you fix the residence upon any town in the Commonwealth, you notify that town at once; and it becomes respon-

sible for the reasonable expenses. If the person has no settlement in any town in the Commonwealth, then you send the bill to the State authorities; and they pay the bill.

DR. BRYANT.—I knew that that was done by the overseers of the poor of different towns, but I did not know it was done by the Boards of Health.

DR. DURGIN.—I have not had any experience outside of Boston, but in Boston the Board of Health always makes and collects the bills. We have rather a wider scope. We collect bills from the United States government, from steamship companies, from towns, from the State, and from the individual; and the same authority to collect may be used by any town or city.

QUESTION.—How soon after a patient is discovered with scarlet fever or diphtheria is he removed, and sent to the hospital?

DR. DURGIN.—Just as quickly as the case is made out to be scarlet fever, and the isolation is shown to the Board of Health not to be sufficient, the quicker the better.

MR. DAVIS.—Mr. President, in the city of Newton there were some cases of small-pox; and they applied to the city of Boston. We paid out of the appropriation of the Board of Health \$1,100 for the care of them.

MR. FOX.—I want to ask where a family is quarantined in that way, where their house is turned into a hospital and they are furnished with provisions, etc., if they become legal paupers?

DR. DURGIN.—You are getting now upon the field which I expected to have covered to-day by the legal profession. A mere experience might perhaps be worth something. We have quarantined houses in Boston, and managed to allow other members of the family not directly connected with the isolated patient to get their own living, and to go and come. In that way you save yourselves a great deal of trouble; and, so far as I know, it has been perfectly safe. There might be instances in which you would be obliged to take charge of all members of the family. In regard to houses, we have had to guard them by police occasionally, as a necessity. It depends largely upon the class of people you are dealing with.

DR. B. F. DAVENPORT.—Mr. Chairman, I do not know but that I can answer the question that has been asked. I was informed, by competent authority, when I had occasion to try to inform myself, that

it is only one who receives aid out of the funds especially appropriated for the support of the poor, the public poor fund, who is thereby made a pauper. Receiving aid from the appropriation of the Board of Health or other public source does not, but receiving aid from the special poor funds makes one a pauper.

THE PRESIDENT.—There comes unfortunately at this time, when we all feel perfectly satisfied that a patient should be isolated and be taken to a hospital, if possible, a note of warning in regard to a danger from the sanitary authorities in the Old World; and the report of the Local Government Board of Great Britain with regard to scarlet fever is so interesting that I will ask Dr Abbott to relate it to you.

REMARKS OF DR. ABBOTT.

In looking over the last Report of the Local Government Board of England, just received, I came across this fact, which appears in two or three districts of England, in relation to scarlet fever: scarlet fever again recurred in the homes of the hospital patients after their return home. There are two or three reasons why such outbreaks might occur. One is on account of insufficient length of stay in the hospital, the patients being returned to their homes too soon, and before desquamation had thoroughly subsided, or before they had entirely recovered from the disease, or possibly the disinfection of the clothing and other things that went with them had not been sufficiently carried out. I should like to ask the question here of the officers of those cities where contagious hospitals exist whether this has been their experience in many cases or in any case, that scarlet fever has recurred in the homes of the children or persons returned; and was it, in the opinion of the board, due to their return?

DR. FARNHAM.—Mr. President, I have had some experience in instances similar to those that Dr. Abbott refers to, the so-called "return cases." In a case in North Cambridge there was a family of three children. One child with scarlet fever was sent to the Cambridge Hospital. There was no large amount of scarlet fever in that neighborhood then. That child was kept at the Cambridge Hospital

eight weeks ; and upon its discharge I am sure, because I examined the child, that there was no desquamation. The skin was as clear and free as it ever could be ; and I was told that the clothing was disinfected, that the child had a bath and had been well washed. The patient came back, and within ten days both the other children had the scarlet fever.

It seems probable to me that in some cases persons recovering from scarlet fever, in whom desquamation has entirely ceased, retain the power of communicating the disease for a period of time the duration of which is at present unknown.

THE PRESIDENT.—Perhaps I ought to add my own experience as one of the trustees of the Cambridge Hospital. We have an isolation building, which was built in accordance with the very best ideas upon the subject, and is, as far as I know anything about hospital buildings, an absolutely satisfactory building. The physicians in attendance are the best of our practitioners. I am satisfied that the administration of the hospital in the exercise of care is far beyond that of any private house in Cambridge. The case which Dr. Farnham speaks of happened in the hospital. The child was sent out when it was believed by the attending physician to be absolutely safe to send it home. Therefore, that child had been disinfected, and the child's clothing had been disinfected. If it had been one case, you might very easily say that any one of the numberless objects that became contaminated by the child had carried the contagion ; but the same thing has happened in three cases, one which Dr. Farnham mentioned and two others. In all these cases desquamation had apparently ceased.

Now, I think we all will agree, certainly all of us that practise medicine, that complete isolation of any child not very seriously sick from scarlet fever for five weeks is absolutely out of the question in any private house. It never is done in any city or town to my knowledge. And yet isolation to that extent in a carefully guarded hospital was not sufficient to protect the family, and it seems to me quite evident that there are certain other problems here of infection which we have not yet unravelled. We have now cultures being sent to the State Board of Health in diphtheria cases where the child is apparently well, where the parent is anxious that the child should

resume its ordinary relations to the world, who not only presents cultures showing more of the specific organism, but unfortunately showing cultures which contain more of the specific organism than they did a week ago. Now, of course, it is not at all impossible that we are going to find in such cases the explanation of a great many of the hitherto unexplained epidemics; but I think we shall agree it is going to complicate the work of the public health officer very seriously.

MR. BRIMBLECOM.—Mr. President,—I recall an interesting case of the spread of scarlet fever which occurred two or three years ago in my city. A family had just taken possession of a very fine residence, when one (the second) of their three children became ill with scarlet fever.

The other children were immediately sent away to their grandfather's and the patient placed in charge of a trained nurse, and removed to a room which the father informed me he had expressly planned for hospital use.

In about six weeks the child recovered, and the place was disinfected by our primitive method of sulphur fumigation. The well children returned to the house; but within two weeks the eldest child was taken ill with the disease, and the same routine was followed as in the previous case. This child was very sick indeed, but recovered; and in about six weeks the house was again disinfected. Again the well children returned home; and inside of a fortnight the youngest child came down sick with the fever, and the same routine was followed. The house was thus in quarantine for about four months, with intervals of possibly a week or so between each case.

The sick children were well isolated and in charge of a trained nurse and skilful physician, and of course were thoroughly disinfected before release from isolation.

Whether or not the spread of the disease was due to defective disinfection of the house I cannot say; but the fact remains that these children, notwithstanding the best of care and isolation, came down with scarlet fever, one after another, within a period of about ten days of the time they returned home.

REMARKS OF DR. A. E. MILLER.

Mr. President, I would like to ask if in the case just mentioned there might not have been germs remaining in the house, so that (in the case of the child that was sent back from the hospital some time after desquamation had ceased) the disease might not have been caused by these germs instead of being conveyed by that child. Now, one reason why I speak of that is because a case just comes to my mind that I had under my care, some two or three years ago, a family of two children. The eldest girl had scarlet fever, and she was isolated in an upper room. Another child, a boy, younger, running around the house, was kept out of that room. That was all the isolation they could give under the circumstances; but, after the one who had had the scarlet fever recovered, the house was disinfected as thoroughly as we could do it. The clothing was exposed to sulphur fumes, and just about a year from that the younger child had scarlet fever. There was no other case of scarlet fever anywhere in that neighborhood, and the question is where that germ came from.

I have been connected in the town of Needham with the public library since we have had a library. Germs are often conveyed by books being returned to the library from houses where there was an infectious disease. Now we burn all such books. They are not allowed to be circulated. We burn them immediately if they come from any house where there is an infectious disease. If there are two families in the house, we are cautious enough not to allow those books to go into circulation again, even if they are returned by the family supposed to be free from the disease.

THE PRESIDENT.—If there is nothing else to be said upon this subject, is there any other subject that any person wishes to bring before the Association at this time?

REMARKS OF DR. J. S. NORTON.

Mr. Chairman, I would like about three minutes to bring before the Association the question of uniform regulations in regard to plumbing. In looking over the pamphlets issued by the different boards of health, I found quite a uniformity in the regulations on

other subjects ; but, when I got to the regulations in regard to plumbing, I found quite a difference. And it seems to me at the present time, when a very large number of houses are being connected with this metropolitan sewer, and the plumbing is being remodelled, if there are any methods of doing plumbing work that are desirable, all cities should have the benefit of them. If there are any ways of doing the work that are not desirable, then the cities that have such regulations should drop them. I have talked with a number of inspectors of plumbing who are of the opinion that it will be very desirable if the authorities of the cities in some way could get together, and adopt some uniform rules in regard to plumbing. Also it would be a benefit to plumbers. A plumber doing work in Everett may go over to Woburn, Malden, or Chelsea, and find in each city different requirements. And it makes a great deal of work to inspect plumbing ; and for that reason, as well as a number of others, it seems to me to be desirable to have a uniform system of plumbing. I would like to have the members of the Association who are interested in the work of plumbing think the matter over, and possibly we can bring it up at the next meeting.

REMARKS OF MR. E. WARDELL.

Mr. Chairman, in regard to what the gentleman who has just spoken has said, I wish to say that the Massachusetts Association of Plumbing Inspectors have had under consideration for nearly a year the subject of the revision of rules ; and they are trying to arrange a model code of plumbing rules which might apply to all cities of the Commonwealth. It was our hope before this time to have been able to present to this Association a set of rules governing plumbing, hoping that this Association as an association might indorse or adopt them. And we were then in hopes of disseminating them to the different boards of health throughout the Commonwealth to the end that there might be uniformity in this matter, and for the benefit of the public health of Massachusetts. It is my hope now that, as we shall have another meeting of the Association, before this Association meets again, we may be able to present a form which I think will be quite an improvement. Of course, the Association of Inspectors of Plumbing is composed of men who are all practical

plumbers. We unquestionably have in that Association some who are as expert as there are in the State, and I am glad this gentleman has mentioned the matter. I think by the two Associations working together they can effect great good in this regard.

DR. DURGIN.—Perhaps the question of plumbing regulations might be met to some extent by a short paper at our next meeting by some competent plumber, who might display in this short paper the discrepancies which are to be found in the different regulations, and perhaps also point out the best ones. If Mr. Wardell will undertake to do this, he will have the gratitude of the Association; and I have no doubt it will be of great use to boards of health and to municipal authorities throughout the Commonwealth. We find the same trouble in these regulations that we find in different parts of the State with regard to death certificates; and I thoroughly appreciate what Mr. Wardell has said, and also Dr. Norton, in regard to these discrepancies, because each examining board is finding candidates from other cities and towns, and from other States, where entirely different methods are practised from those which we have in our own city.

REMARKS OF MR. J. W. COSDEN.

Mr. President, it has been the desire of the Master Plumbers' Association of Massachusetts, and also of the city of Boston, to have the rules in each and every town correspond with each other, so that the men who are going from one town to another can do their work in accordance with the same methods, just the same as in Boston. I believe that some time ago there were gentlemen appointed to bring these rules up in the Association of the Inspectors of Plumbing, so as to have them all alike. We called for a hearing at our last Association meeting; and the chairman of our committee said that he had notified all the members, but they had not met to decide the matter. This subject is certainly under the control of the State Association and the Association of Master Plumbers of the city of Boston.

DR. ABBOTT.—Mr. Chairman, I should like to make an announcement if it will not be out of place. Within the past month or two

there have been a great many requests for manuals of the health laws published by the State Board of Health. The book has been out of print for two or three months past. The last edition was larger than former ones; but it has not lasted so long because the demand for it has been greater, and, consequently, a new one is now in preparation. It is all ready for the printer except the final revision. It has all been medically revised, and is now going through the hands of an expert lawyer who is doing the work very carefully. It will be ready within a few weeks.

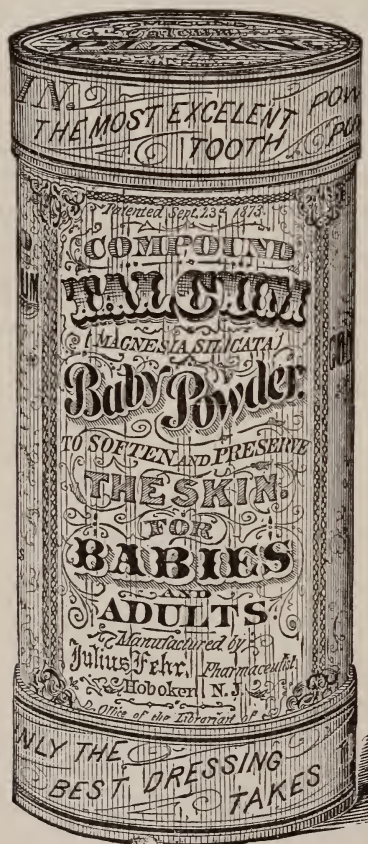
THE PRESIDENT.—Before we adjourn, Dr. Durgin wishes me to say that he has a leper on exhibition somewhere here that possibly some members of the Association may care to see; and those of the Association who care to spend their time in contemplating the more natural objects may stay down here until the steamer sails for Boston, where it is expected we shall arrive at half-past five.

The meeting was then adjourned.

DR. JULIUS FEHR'S

"COMPOUND TALCUM"

"BABY POWDER."



THE

"Hygienic Dermal Powder"

FOR

INFANTS AND ADULTS.

Originally investigated and its therapeutic properties discovered in the year 1868 by Dr. Fehr, and

Introduced to the Medical and Pharmaceutical profession by Dr. Fehr, in the year 1873.

COMPOSITION.

Silicate of Magnesia with Carbolic and Salicylic Acids.

PROPERTIES.

Antiseptic, Antizymotic, and Disinfectant.

USEFUL AS A GENERAL SPRINKLING POWDER,
With positive Hygienic, Prophylactic, and Therapeutic Properties.

GOOD IN ALL AFFECTIONS OF THE SKIN.

Sold by the Drug Trade Generally.

Per Box, Plain	\$0.25
Per Dozen	1.75
Per Box, Perfumed50
Per Dozen "	3.50

THE MANUFACTURER,

JULIUS FEHR, M.D.,

Ancient Pharmacist,

Hoboken, N.J.

Only advertised in Medical and Pharmaceutical prints..

JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

RECORDS OF

October Quarterly Meeting
1896

SUBJECTS: Care to be observed in making Health
Regulations; Restriction of the Spread of Measles

THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are two dollars.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,—to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, Boston.

All communications to the Association should be addressed to the Secretary, Edwin Farnham, M.D., City Hall, Cambridge, Mass.

Subscriptions and all business communications should be sent directly to the publishers,

MAYNARD & SMALL,

6 Beacon Street, Boston.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Organized 1890.

[This Association as a body is not responsible for statements or opinions of any of its members.]

VOL. VI.

December, 1896.

No. 4

OCTOBER QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

A quarterly meeting of the Massachusetts Association of Boards of Health was held at the Parker House, Boston, Thursday, Oct. 29, 1896.

The meeting was called to order at 2.30 P.M., President Walcott in the chair.

THE PRESIDENT.—Will the Association be pleased to come to order? The Secretary will read the record of its last meeting.

The records of the last meeting were then read by the Secretary.

THE PRESIDENT.—If there be no objection to the record just read to you, it will stand as the record of the last meeting of the Association.

The Executive Committee report to the Association, with a recommendation that they be elected to membership therein, the following names :—

FRANK H. PARKER, M.D., Malden.

JOHN M. KEYES, ESQ., Concord.

THOMAS TODD, ESQ., Concord.

F. H. CLEAVES, M.D., Concord.

Is it your pleasure that these gentlemen be elected to membership in this Association?

The gentlemen named were then voted upon and declared duly elected members of the Association.

THE PRESIDENT.—The Association is now ready for any miscellaneous business that any member may be disposed to bring before it at this time.

If there is nothing of that description, the next piece of business in order is a paper upon the "Care to be Observed in Making Health Regulations," by Mr. Bailey, Corporation Counsel of Boston.

Mr. Bailey has sent a note saying that he is unavoidably detained, and probably will not be able to be present.

But, while it would be true in some associations that this might be a case of Hamlet dropping out of the play, and the play necessarily being of very little interest, Hamlet being gone out of it, this Association has present at least three Hamlets. And it does not make very much difference whether Mr. Bailey is here or not, because our friend from Salem and our friend from Cambridge are able to provide us with all the law that we can apply, I am certain; and I think I will give Mr. Gove the first chance.

MR. GOVE.—Mr. Chairman, I should consider my position a little more unfortunate, not having prepared myself at all upon this special point, if it was not for the fact that Mr. Bailey has written in such a way as to furnish me with an ample amount of material, most of which comes from the best authority,—the judges of the Supreme Court of the United States, and the judges of the Supreme Court of this Commonwealth.

The substance of these cases which Mr. Bailey has sent us seems to be the magnifying of what perhaps we are disposed to fully appreciate,—and a good many of the public are, too,—the extent of the authority of the Boards. That is not exactly what the paper indicates the subject to be; viz., caution on our part. But I think the cases here bear more on the extent of our authority.

This power to make health regulations comes under what is generally known in law as the police power; that is, the power to look out for the general welfare and the public safety.

This case in the United States Supreme Court is about a page and a quarter, marked by Mr. Bailey to be read, showing that the legislature has very ample powers in that respect, and powers which it cannot abrogate or divest itself of. The Court says:—

But there is another question in the case, which, as it seems to us, is equally decisive.

The plaintiff in error was incorporated “for the purpose of manufacturing malt liquors in all their varieties,” it is true; and the right to manufacture, undoubtedly, as the plaintiff’s counsel contends, included the incidental right to dispose of the liquors manufactured. But although this right or capacity was thus granted in the most unqualified form, it cannot be construed as conferring any greater or more sacred right than any citizen had to manufacture malt liquor; nor as exempting the corporation from any control therein to which a citizen would be subject, if the interests of the community should require it. If the public safety or the public morals require the discontinuance of any manufacture or traffic, the hand of the legislature cannot be stayed from providing for its discontinuance, by any incidental inconvenience which individuals or corporations may suffer. All rights are held subject to the police power of the State.

We do not mean to say that property actually in existence, and in which the right of the owner has become vested, may be taken for the public good without due compensation. But we infer that the liquor in this case, as in the case of *Bartemeyer v. Iowa* (18 Wall. 129), was not in existence when the liquor law of Massachusetts was passed. Had the plaintiff in error relied on the existence of the property prior to the law, it behooved it to show that fact. But no such fact is shown, and no such point is taken. The plaintiff in error boldly takes the ground that, being a corporation, it has a right, by contract, to manufacture and sell beer forever, notwithstanding and in spite of any exigencies which may occur in the morals or the health of the community, requiring such manufacture to cease. We do not so understand the rights of the plaintiff. The legislature had no power to confer any such rights.

Whatever differences of opinion may exist as to the extent and boundaries of the police power, and however difficult it may be to render a satisfactory definition of it, there seems to be no doubt that it does extend to the protection of the lives, health, and property of the citizens, and to the preservation of good order and the public morals. The legislature cannot, by any contract, divest itself of the power to provide for these objects. They belong emphatically to that class of objects which demand the application of the maxim, *salus populi suprema lex*; and they are to be attained and provided for by such appropriate means as the legislative discretion may devise. That discretion can no more be bargained away than the power itself. *Boyd v. Alabama*, 94 U.S. 645.

Now that, of course, is on the liquor law, and goes far enough to show that health regulations stand on the same footing, and come

under the same head of police power. Now a small part of a long case in Massachusetts, the case of *Commonwealth vs. Alger*, Mr. Bailey has marked, about as long as the other, which distinguishes this right of regulation and control for the benefit of the health or welfare of the public from the right of eminent domain. The Court says:—

This is very different from the right of eminent domain, the right of a government to take and appropriate private property to public use whenever the public exigency requires it; which can be done only on condition of providing a reasonable compensation therefor. The power we allude to is rather the police power, the power vested in the legislature by the constitution, to make, ordain, and establish all manner of wholesome and reasonable laws, statutes, and ordinances, either with penalties or without, not repugnant to the constitution, as they shall judge to be for the good and welfare of the Commonwealth, and of the subjects of the same.

It is much easier to perceive and realize the existence and sources of this power, than to mark its boundaries or prescribe limits to its exercise. There are many cases in which such a power is exercised by all well-ordered governments, and where its fitness is so obvious that all well regulated minds will regard it as reasonable. Such are the laws to prohibit the use of warehouses for the storage of gunpowder near habitations or highways; to restrain the height to which wooden buildings may be erected in populous neighborhoods, and require them to be covered with slate or other incombustible material; to prohibit buildings from being used for hospitals for contagious diseases, or for the carrying on of noxious or offensive trades; to prohibit the raising of a dam, and causing stagnant water to spread over meadows, near inhabited villages, thereby raising noxious exhalations, injurious to health and dangerous to life.

Nor does the prohibition of such noxious use of property, a prohibition imposed because such use would be injurious to the public, although it may diminish the profits of the owner, make it an appropriation to a public use, so as to entitle the owner to compensation. If the owner of a vacant lot in the midst of a city could erect thereon a great wooden building, and cover it with shingles, he might obtain a larger profit of his land than if obliged to build of stone or brick, with a slated roof. If the owner of a warehouse in a cluster of other buildings could store quantities of gunpowder in it for himself and others, he might be saved the great expense of transportation. If a landlord could let his building for a smallpox hospital, or a slaughter-house, he might obtain an increased rent. But he is restrained; not because the public have occasion to make the like use, or to make any use, of the property, or to take any benefit or profit to themselves from it; but because it would be a noxious use, contrary to the maxim, *sic utere tuo, ut alienum non ladas*. It is not an appropriation of the property to a public use, but the restraint of an injurious private use by the owner, and is, therefore, not within the principle of property taken under the right of eminent domain. The distinction, we think, is manifest in principle, although the facts and circumstances of

different cases are so various, that it is often difficult to decide whether a particular exercise of legislation is properly attributable to the one or the other of these two acknowledged powers.

Now there is one other case which is somewhat longer. I do not know whether, in spite of Mr. Bailey's request, I ought to weary the company with reading the whole of it. He has marked the whole opinion of the Court in this case of *Commonwealth v. Cutter*, and it applies directly to the question of health:—

MORTON, J. It is plain that the general object of the ordinance is to promote the health of the inhabitants of Boston. By the Pub. Sts. c. 27, sec. 15, towns may make by-laws for preserving peace and good order within their limits; and by the St. of 1854, c. 448, sec. 35, the City Council of Boston is given the "power to make all such needful and salutary by-laws or ordinances . . . as towns . . . have power to make and establish." By the Pub. Sts. c. 28, sec. 2, it is also provided that "chapter twenty-seven . . . shall apply to cities so far as . . . not inconsistent with the general or special provisions relating thereto: and cities shall be subject to the liabilities, and city councils shall have the powers of towns." The power of cities and towns to adopt ordinances and by-laws for the preservation and promotion of the health of their inhabitants has often been upheld as an exercise of the police power, and is one of their most necessary and salutary powers. *Vandine, petitioner*, 6 Pick. 187. *Commonwealth v. Curtis*, 9 Allen, 266. *Commonwealth v. Patch*, 97 Mass. 221. Dillon, Mun. Corp. sec. 369.

The defendant in the present case contends, however, that the ordinance in question is unreasonable and indefinite, and that it imposes duties which he lawfully cannot be required to perform. It appears from the agreed facts, which form a part of the exceptions, that at the time of the complaint, and for a long time prior, the defendant was and had been the owner of a lot of land on Leverett Street, which in the rear abutted on and extended to the centre of a private passageway about four feet wide, which ran northerly and southerly about two hundred and twenty-four feet, between other premises fronting on Leverett and Wall Streets, and which was connected with Wall Street through another private passageway, also about four feet wide. These passageways were laid out and maintained by the abutters thereon for the benefit of all the lots. The land formerly belonged to the City of Boston, which reserved the right to lay a sewer through the whole of said passageway, and which for many years had kept the passageways clear, though always claiming that it was not its duty to do so, but ceased to do it in the spring of 1891, when the Street Department was reorganized. It is a matter of common observation that there are many such passageways in the city of Boston as the one thus described, and we see nothing unreasonable in an ordinance which forbids those who own or occupy lands abutting on them, and who have the right to use them, to allow filth to remain on that part of them adjoining the lands of such owners or occupants. It is analogous to an ordinance requiring owners or occupants to clear the snow from sidewalks adjoining their respective houses or lands.

Goddard, petitioner, 16 Pick. 504. In *Pierce v. Bartrum*, 1 Cowp. 269, a by-law of the city of Exeter, which provided, among other things, that no person within the walls should keep "any stinking filth, garbage, or annoyance within his house, curtilage, or back-side," was held good, although, it is true, the point now raised was not before the court. It is for the benefit of the owners and occupants of lands abutting on private passageways and who have the right to use them, as well as to the advantage of the public health, that the ways should be kept free from filth; and the fact that in order to keep them free from filth such owners and occupants may be obliged to remove matter which they had no agency in depositing there, or to do what they would not be obliged to do if they did not own or occupy land abutting on the private passageway and have the right to use it, does not render the ordinance unreasonable, or impose upon the owner or occupants duties which they lawfully cannot be required to perform. *Goddard, petitioner, ubi supra*.

No doubt, as argued by the defendant, the object of the city council in passing the ordinance was to compel the removal of the filth from passageways; but it could accomplish that as well by making it penal to suffer filth to remain there as by a direct provision that it should be removed; and we see nothing indefinite in such a provision, or in the omission to provide a time beyond which the filth should not be allowed to remain. The words "suffer . . . to remain" imply an opportunity to remove, and a failure to do so. Thereupon, the offence becomes complete. It needs no argument to show that, if the city had kept the passageways clear for many years under protest, that fact is no defence if the ordinance requires the defendant to do the work which the city has done. Nor is it any defence that another ordinance forbids the defendant to remove filth or refuse matter through the streets without a permit from the Board of Health. If there were no other way of removing the filth except through the streets, which the defendant was forbidden to do, there would be more force in the defendant's objection. But it does not appear that there is not. Indeed, it appears that there is an ordinance making it the duty of the sanitary police, as they are called, to remove all "noxious refuse substances from yards and areas, when so placed as to be easily removed." Revised Ordinances of Boston of 1890, c. 19.

The facts in the present case find that the defendant owned to the centre of the way, and had a right to use the passageway as a way, and that at the time of making the complaint there was, and had been for some time, filth upon that part of the passageway abutting and adjoining his land. It is immaterial how the filth came there. The ordinance made it his duty not to suffer it to remain; and he was bound at his peril to see that it did not stay there. *Commonwealth v. Curtis*, 9 Allen, 266. The reasonableness or sufficiency of an ordinance or by-law is not to be tested always by its application to extreme cases. *Commonwealth v. Plaisted*, 148 Mass. 375, 382. Perhaps a proper construction of it might not admit of their being included within it. We think that in the present case the ordinance is not unreasonable, or indefinite, or oppressive, and that it imposes nothing on the defendant which he may not lawfully be required to do.

Of the various grounds contained in the motion to quash, the defendant has argued only three: viz., that the complaint does not set out any violation of, or

offence under, the ordinance ; that it contains no allegation, as it ought, of the length of time the filth had been suffered to remain by the defendant ; and that it does not set out any of the defendant's right to use the passageway. The first two are disposed of by considerations already adverted to. As to the third, it is sufficient, we think, to say that the evident purpose of the statute was to provide that owners or occupants of lands abutting on a private passageway, and having a right to use the passageway as and for a way, should not suffer filth to remain in it. The liability is limited to those owning lands abutting on the passageway, and having a right to use the way. The language of the complaint follows the language of the ordinance, and we think it plainly means that the defendant had the use of the passageway as a passageway would be used ordinarily,—*i.e.*, as and for a way, not to swing blinds or project awnings over,—and therefore includes all the facts necessary to constitute the offence. *Commonwealth v. Barrett*, 108 Mass. 302. Whether the right of the defendant to use the way was appurtenant to the land belonging to him or not was immaterial, and therefore no allegation concerning the nature of the defendant's right was necessary in the complaint. The city lawfully could adopt an ordinance which made it penal for one owning or occupying land on private passageways, and having an easement of way over the passageway, to suffer filth to remain on that part of the way adjoining such land. Clearly, the owner or occupant would have the right to remove obstructions from the way, or to repair that portion of it, and we see no difficulty in holding that the city may provide that he shall not suffer any filth to remain there.

Exceptions overruled.

Now this distinction which is made between the right of eminent domain and the police power is an important one, and it is sometimes difficult to show the exact limits between the two. A matter to which I had thought of calling the attention of the Corporation Counsel of Boston, when he should speak, is involved in one or two cases in the Supreme Court reports, which seem to make an application of that principle of distinction between the two that is liable to cause some trouble to the Boards of Health unless they proceed with caution. We are at present in the midst of a pretty extensive outbreak of diphtheria in Salem, and we have no permanent contagious disease hospital, and no provision for one sufficient to take care of the cases which we have. In addition to that, we have a public sentiment there which would hardly make it possible for us to adopt a general rule which does seem to be the rule contemplated by the statutes, of moving those who are able to be moved, from their homes to a hospital. As a substitute for that measure, we found that the best thing we could do was to procure as complete isolation as possible, to prevent the passage of people to and from

the premises where the parties were sick. The law provides that where the party cannot be moved, he can be kept in the house, with or without the consent of those interested in the premises, and the place shall be considered as a hospital and subject to the regulations of a hospital. But there have been two or three cases arising where it has been held that the Board of Health is not entitled to take the place and use it as a hospital. It can be deemed to be practically a hospital, and regulated accordingly. That is something which apparently the Court considers as falling within this police power, to make all proper regulations in regard to intercourse between the persons in the house where there is a contagious disease, and those outside ; but not to undertake to regulate the way in which the patients shall be treated, or exercise any control over the premises themselves,—a thing which apparently they consider falls under the right of eminent domain. And it is not merely a question of whether compensation is to be paid, because the legislature has not authorized anything of the kind, and members of a Board of Health undertaking to do it render themselves personally liable.

The line is a pretty narrow one, sometimes, as to just how much you can do in regard to infected premises, without going so far as to use them as a hospital under your own control. There is one very interesting case, a very recent one, in the 162 Massachusetts Reports, where there was a case of smallpox in a house, and some one from outside came into the house without the authorities being able to prevent it, and looked into the room and went away again,—I do not know that the authorities knew about it at the time,—and was taken down with the disease. And then the parties in the house made arrangements surreptitiously and took that party back into the house, and she was sick there with smallpox in a serious form and continued sick after the other person had recovered. Of course the tenants in the house who took her in could not complain, because they had done it themselves. But the landlord brought suit against the members of the Board of Health, claiming that, while he could not find any fault in regard to the original patient, the disease had been kept in the house longer, and there was more of it, by reason of the taking in of this outsider, and that the Board of Health in this way had made the house a hospital and used it as a hospital, and he had not been able to let it as he could have done if there had been less contagious disease there ;

and he asked for damages. The report is rather unsatisfactory and indefinite. It says there was some other evidence of the use of the house as a hospital, so we do not know quite how far the case goes. But the final decision of the court was that the members of the Board of Health were liable. It is a pretty important thing, when you have a case in a house and are trying to do the best you can with it, to know just how far you can go without overstepping this line. I do not think that the limits are very distinct, and it is a question which has caused some difficulty. I do not know that it is anything more than a practical question. It is pretty hard to make it a strictly legal question; and it has this unfortunate peculiarity about it, as a great many cases have, that it is finally to be left to a jury, and nobody can tell what the jury is going to do or how they are going to decide a thing. It is about as indefinite as the old measure of the length of the king's arm. The peculiarity of the jurymen's minds controls, just the same as the physical peculiarities of the king used to control the measures of length.

I do not think, while we have been talking on the general subject somewhat, we have come very near the specific subject which was set down here, as to care in making regulations. The care in applying the laws has been considered somewhat; but the matter of making by-laws, making regulations, we have not come down to very closely. There are a number of things that Boards of Health may do if they make proper regulations for them, but they must first make the regulations and publish them. I did not think of speaking of that particular point, and I do not think I am prepared to speak upon it, although it is a little more germane to what was set for us to consult upon. Our Board undertook to revise its by-laws a short time ago, but they have not completed the work, and we are still acting under by-laws which were made before I became connected with it; and I do not know that I am prepared to say much about that particular point. In general, it may be said that about the same care must be used to see that the regulations are legal and are correctly framed that must be used in the framing of ordinances which a city council makes; and in both cases I think it is important to make the fullest possible use of the advice of the legal adviser of the city. I think that none of these rules ought to be made without having passed the scrutiny of the City Solicitor or Corporation Counsel of the place.

THE PRESIDENT.—I know that I express the sense of the Association when I say that we should be very glad indeed to hear any of the legal warnings which our friend Mr. Pevey can address to us from his large experience in a city which, even if I am a resident of it, I hope I may be permitted to say, has always been uncommonly fortunate in its health organizations from the beginning down to the present day.

CITY SOLICITOR PEVEY OF CAMBRIDGE.

Mr. Chairman, and Gentlemen of the Association,—It is certainly a surprise to me to be called upon here to-day. I did not come here to speak and had not the slightest idea that I should say anything. I came here by the invitation of my friend, the Assistant City Physician of Cambridge, Dr. Lewis L. Bryant. But this subject that you have here to-day was an attractive subject to me, and I told him, when he invited me, that I should be very glad to hear what Mr. Bailey might have to say on this subject.

As to the care to be observed in making health regulations, from my experience of the laws in relation to the Health Department, I should say, and should advise, that you should take considerable care in making health regulations. There is, I have already found, a great uncertainty in the minds of the different Boards of Health, as far as I have seen them and inquired into their workings, as to what powers they have in the enforcement of laws relating to health. Some one or two years ago, when our Board of Health in Cambridge were considering in what position their laws were, they consulted me in reference to the matter. The question arose, if I remember right, because of some growth or some increase of the disease of scarlet fever in Cambridge. I think that was it. It may have been small-pox or some fear of smallpox. I thought I would go to some of the different Boards to see if the members of the Boards of Health that had had large experience had any definite ideas as to the extent of their power in enforcing the laws, for instance, in relation to small-pox. And so I, in the first place, went to that great source of information and knowledge, the Boston Board of Health. And I inquired of quite a number of the members, parties that I found in possession of the office, if they had any suggestions to make to me in the con-

sideration of that subject. I found that they were a good deal uncertain as to their powers in the enforcement of the law in that direction. In fact, they could only refer me to a case which I suppose many of the boards have had brought to their attention: I think it was a case that occurred in Spencer, or some town in the western part of the State. I do not recall the case now; but in that case the Court go somewhat at length into the powers of a Board of Health. I found that the same uncertainty that was manifested by the Board of Health in Boston also existed in other Boards of Health. And in view of this uncertainty of opinion, and in view of the reports I brought back to our Board of Health at that time, they thought it was their duty to see if they could make more efficient regulations in regard to the enforcement of the law. And so, under the advice, as far as that advice could go, of the City Solicitor, our very efficient and energetic Board of Health—last year, I think it was—made some new regulations; and, as far as those regulations go, I think they are as near perfect as they can be made under the present law. They are quite voluminous, and they cover a very broad variety of subjects.

Now there is not only this uncertainty existing in the minds of the Board of Health, but there is an uncertainty in the law. I looked into the law to some extent at the time that our Board were making these new regulations, and I find there is a good deal of uncertainty as to what power the laws give to a Board of Health in the enforcement of the law. There is no doubt that the Supreme Court (as my brother Gove has said) have very distinctly ruled that the legislature has a right to enforce the laws in regard to the protection of public health. But it does seem to me, as I have studied the matter, that the laws, as we have them now on our statute book, are very vague and uncertain, and the powers given to Boards of Health are very limited; and it is for that reason, I think, that the Boards are so careful about going to any extent in the enforcement of the law. And there may be some cause for these very imperfect laws in regard to the enforcement of the law about the protection of health in this country. As we all know, there is a feeling—and you and I have that feeling to a certain extent—that the rights of personal liberty, or the rights of individuals in their own property, should be very carefully preserved, and that the attempts of the law to interfere with

the right of property or with personal liberty should be very carefully scrutinized. And I think it is with that idea that, up to the present time, we find upon our statute books the laws in reference to the enforcement of laws of health in this uncertain and this vague and indefinite state. There is a feeling against any enforcement of law in regard to any disease. Since I have been here this afternoon a member of the medical fraternity in a town adjoining the city of Cambridge has called to my attention an incident in his practice as to an attempt to enforce laws in relation to the public health, and the opposition that he met among respectable and well-meaning people. Now, that feeling is, I think, universal throughout all the communities. And it is that feeling that the law-makers have to contend with when they undertake to pass laws in reference to the enforcement of laws in regard to public health. Each man, the law says, has a right to use his own. But the law also says that each man must use his own so as not to injure his neighbor. And, applying that maxim, the laws as they now exist upon the statute books, in my opinion, could be very much enlarged without any interference with the personal right or liberty of the individual in the management of his own property

And it appears to me, gentlemen, from my study of this subject, and so far as I have been able to give it any attention, with my other numerous duties, that, in view of these serious epidemics and diseases that are liable to spread all over our country, and over our different communities, in view of these dangers that are always with us, the time has come when the laws in regard to public health and to the enforcement of the same should be recodified in such a way that Boards of Health, as now organized, should know more clearly what rights they have, and what rights the legislature have intended to give to them. And they should not be compelled, when they have done the best they could in the enforcement of the law, to go before juries, and leave their cases to the mercy of a jury. Now that can be done, I think, gentlemen, if all of you who constitute the different Boards of Health throughout this State, with what practical knowledge and experience you have had in the administration of law from time to time, put that practical knowledge together, and shape that knowledge which you have gained from experience and practice in your different positions and localities. I think in that way you can go to

the legislature and have these laws recodified, and have a greater power given to you, more explicit powers, and save each Board of Health in each locality much trouble and difficulty.

I did not intend, gentlemen, to extend my remarks in this way. But this, as I said before, is to my mind a very interesting and practical subject at this time. I think I voice the sentiment of every Board of Health here, no matter where you come from, or what section of the State; I think you all feel that there is this uncertainty in the administration of the law. And the solicitors of the different towns and cities where you reside will tell you, I think, if they have studied into this matter, that there is an uncertainty in the law. And they will also tell you, I think, and they will agree with me in this, that the law can be made more explicit, and that you can have more definite powers than you have. You can do the communities in which you live a great amount of good if you can have the laws made more explicit, and your powers made larger, so that you may protect yourselves and your families and your friends about you.

VICE-PRESIDENT DURGIN.—The intent of this subject to be discussed was more particularly that of the care in making the regulations which is provided for under the statute law. The statute law reads somewhat like this: "The Board of Health shall make such regulations as it deems necessary for the preservation of the public health," etc. Now, in making those regulations, it becomes necessary, as we all know, to make them pertaining to subjects which the preservation of the public health requires, and in such terms as might be regarded as reasonable. Otherwise, they are open to question, and they are open to objection in the courts. I think there has been an experience recently with the Concord Board of Health, and it may be interesting to the Association to hear the particulars of that case. And I will call upon some member, perhaps the Secretary of the Concord Board of Health, to give you the history of their case, which I think will open up to you more particularly the object of this discussion.

MR. THOMAS TODD.—I am laboring under the same trouble that my two learned brothers who have spoken before me labored under, in the fact that I did not know until a few moments ago that I was to speak of this case.

My brother has spoken of the uncertainties of the law. I have a very vivid sense that the law is very certain. It certainly was a very certain factor in our case, in that we were routed, horse, foot, and dragoons; and there was nothing left of us any more than there was of the Irishman's whiskey bottle,—nothing left but the cork and the smell. We were absolutely routed.

It may have come to the minds of several of the gentlemen present that there is such an institution as the Massachusetts Reformatory, located at Concord. Probably none of you have ever visited it; but I hope you will sometime, in some capacity or other; and you will find there the very efficient superintendent, a Mr. Scott, who succeeded Gardner Tufts. Mr. Scott is a very fine man, a very fine manager of the institution. Now the Concord Board of Health have a sense that, to a certain limited degree, the health of the town is placed in their charge. They have an idea that in case of contagious diseases they would be called upon immediately to exercise their powers in repressing and taking care of those cases that might occur in the town. We made regulations after the pattern of Boston and of other suburban towns as far as we could, changing them according to the locality. In the pursuit of our investigation and examination, we went up to the Massachusetts Reformatory. Being free citizens, we were refused admission. Had we been criminals it would have been another matter, we assure you. They told us we had no rights inside there. Again, the State of Massachusetts owns a large number of houses in which the officers of the institution reside. They are entirely outside and separate from the institution itself. Each house, of course, is plumbed according to the ideas of the plumber and other persons whom the deponent knoweth not. And we felt that it was our duty to investigate those matters. We were refused admittance to any one of those houses, and told that we could not enter. We disputed the point with Mr. Scott, a very fine gentleman, by the way. I don't want to say anything against him; but he was a representative of the State, and felt that he had the whole charge of the State property up there in his own hands. We were refused admittance. The case, by mutual agreement, was then referred to the Attorney-General of the State, Mr. Knowlton. If you have leisure, I should like to take about ten or fifteen minutes to read to you about it. If you have not, I will give you a general summary comprising

the matter which will probably take five or ten minutes longer, whichever way it pleases you. The Concord Reformatory press printed this matter for their own enjoyment and ours.

VICE-PRESIDENT DURGIN.—Pardon me one moment. This subject which you are reading now has been before the Association, and has been printed in its *Journal*.

MR. TODD.—I beg your pardon. Then I do not care to present it.

VICE-PRESIDENT DURGIN.—I was not aware of the fact until you had actually begun to read it; but I find it has already been printed in one of our late *Journals*.

MR. TODD.—Then it is not necessary for me to take up your time, gentlemen, any more except to say that the Attorney-General decided against the town authorities,—the Board of Health,—and decided that we had no right to enter private houses. Well, then our genial superintendent of the Reformatory,—I guess this has not been in print,—our genial superintendent of the Reformatory concluded that perhaps the limit extended also over his own private property, owned by himself and occupied by tenants. We made a regulation that I will read. It is only six lines: "In no classes of buildings, whether public or private, shall water-closets be used or allowed to be used in cellars or in any room or apartment that has not a window having an area of at least three square feet or an air shaft opening directly to the external air of at least six inches internal diameter." This is a copy of the regulations of other towns. The owner of the house concluded that, as he was under the mantle of authority, he would still dispute our authority, so he refused to fix his premises. He had a water-closet that opened directly into the kitchen of the house, where all the inhabitants of the house were regaled with effluvias that did not come from the kitchen necessarily. And we labored with the gentleman quite a little, and finally we resorted to the law. And then came in the certainties of the law. The case was presented by our lawyer, and thrown out by the Court as being an improper regulation. So that now any persons in our town can build their water-closets under their own beds, over their beds, in the dining-room, parlor, kitchen, or whatnot; and we are powerless to act. So it seems to me that the uncertainties of the law have become certainties.

VICE-PRESIDENT DURGIN.—Have you the decision of the Court in that case,—I mean the later case?

MR. TODD.—I haven't it with me. I have a copy of it in our records. The judge threw it out simply because, he said, the regulation was improper.

A MEMBER.—Was it a private citizen?

MR. TODD.—A private citizen, a private house, nothing to do with the Reformatory, except that the superintendent of the Reformatory owned the building.

A MEMBER.—Did you appeal the case?

MR. TODD.—The Commonwealth cannot appeal a case. We were using the power of the Commonwealth in prosecuting the case.

A MEMBER.—Was it the District Court?

MR. TODD.—It was in the *local* Municipal Court.

VICE-PRESIDENT DURGIN.—This latter case is the one which I had reference to in calling upon the gentleman, and it points you directly to the question which is before the Association, as to what constitutes a reasonable regulation. It is a case in point, and one which may well be discussed and considered by every Board of Health in making its regulations,—regulations which must sooner or later come before the courts.

DR. DAVENPORT.—I knew of a case dealing, not with the State, but with the United States. Some few years ago, in the town of Watertown, when trying to clean out the sewage running into the river, we sent our agent to examine the sewers discharging into the river; and, understanding that there was a very large sewer running in, through, and out of, the United States Arsenal grounds, our agent in due course of progress came down to that region and went in and saw the commandant and told him what he was doing, and informed him that of course we should not attempt in any wise to regulate it, but asked the privilege of being allowed to see if the information was correct. And he was informed that this was United States territory, and that we had no authority whatsoever, and he was directed to leave the grounds.

VICE-PRESIDENT DURGIN.—It was some years ago, in the days of the service of John P. Healey as City Solicitor of Boston, that I had some

conversation in regard to the rights of Boards of Health to make regulations ; and, speaking upon the very point that we are discussing this afternoon, Mr. Healey said to me, "In making your regulation be careful that you make it a reasonable one." And he illustrated in this way : "If you should make a regulation prohibiting the use of the Charles River waters upon your streets because you thought they were filthy and unfit to place upon the streets, I think it would be an unreasonable regulation, and you would not be borne out in the courts. But if you had reason to think that the waters of the Charles River were filthy and unfit to put on your streets, make your regulation thus : 'No filthy water shall be sprinkled upon the streets of the city.' And then, if the waters are taken from the Charles River or elsewhere, and you find that they are filthy and that they are being sprinkled upon your streets, you can prosecute the party who is doing that, under your regulation."

Has any other gentleman any remarks to make ?

DR. FRENCH.—I will simply relate a little of our experience with law and lawyers. When I first became a member of the Board of Health of Clinton, some ten years ago, I supposed Boards of Health had almost unlimited powers, and that there was hardly any authority that could curtail those powers ; and I had a very high and exalted opinion of my position as a member of the Board of Health. But, after ten years' experience, I have diminished very much in my own estimation. And, as a member of the Board of Health, I do not know whether we have any powers at all. When it comes to the question of law, it rather strikes me that, if we have the best lawyer, we have got a pretty good case ; but, if our opponent gets a smarter lawyer than we have, our case is a poor one. That is, in a few words, my experience in regard to law and lawyers.

VICE-PRESIDENT DURGIN.—The question is still open for discussion.

MR. FARWELL.—There is one case we have had before our Board within the last two or three months which I should like to bring before the members here. We had a case of diphtheria. And before that, I would state that we had had a great many cases, and we felt that there was danger of an epidemic.

This case was the case of a young man who was hired by the parties owning the place or living in the place, to distribute milk. And he was taken down. He was without friends ; and, when a doctor was called to the case, they stated that there was no one to take care of him, and that they did not want the case in the house. The case was referred to the Board of Health ; and, as we have no hospital there, it was decided that the case must be quarantined in that place. Then we were obliged to furnish a nurse for the care of this party. The doctor who was called in the first place said that the patient would not live through the night. That was the understanding. We found that it was a case that would be neglected unless a nurse was furnished, and we furnished a nurse for the case ; and there was no care taken by the parties in the house. They were old people, and said that they were unable to care for this party. At that time the distribution of the milk was also stopped, as in our opinion it might tend to scatter the disease. Now the question that I should like to bring before the members here is, whether the Board are responsible for the payment of the milk which was stopped at that time. It has been stated by parties interested that they thought that the Board was responsible for the stopping of the business of this man at that time.

VICE-PRESIDENT DURGIN.—Will Mr. Gove have the kindness to close the discussion ?

MR. GOVE.—Mr. Chairman, as I said before, it seems to be the intent of the law,—unless an agreement can be arrived at,—that, in cases where the party is able to be removed, he shall be removed to a hospital. I have made some criticisms on the law, I think ; but I believe that is the law. And it seems to me that, in this case, it was necessary, in order to proceed, that some other place should be provided, at the expense of the town, to which this person should be taken. If there is no hospital, there is provision made in the law by which a suitable place may be taken as a hospital by the authority of law, for the time being, and suitable compensation must be given for the use of the place. And there, I think, the Board acted wrongly, assuming that the party could be moved.

But, if we assume that the state of the patient was such that it was not safe to move him from this place, then, I think, under that law

which Mr. Bailey has sent in here the Board had authority, under State law, to cause him to be cared for at the place. They could make suitable regulations about his care there, and treat the place as if it was a hospital, so far as regulations are concerned to govern health, — but not take the place into their possession and use it as a hospital. And I think, apart from the statute law, they had at the common law — under this police power, and distinct from the right of eminent domain, which requires compensation to be made — a right to make all reasonable regulations to prevent the spread of disease from the place. And, if it was a reasonable regulation that no milk should be distributed from that place, it seems to me they could make that regulation, and nobody could claim any compensation for it. That is merely a regulation that a person shall use his own property in such manner as not to injure others ; or, in other words, that he shall not use it in such a way as to injure others. But it was not in any way a condemnation or confiscation of any property of his. It was merely a regulation preventing him from using it in an obnoxious manner.

VICE-PRESIDENT DURGIN.—The next business on the programme is a general discussion upon the subject, "What measures should be taken to restrict the spread of measles?"

This discussion will be opened by Dr. Edwin Farnham, of Cambridge.

DR. EDWIN FARNHAM.—Measles is a widely distributed, quite prevalent, and at times exceedingly fatal, disease. At other times the disease, though prevailing extensively in a locality, has a very low fatality, being of a mild type. There are quite a number of vague statements regarding its prevalence when it has occurred in certain limited outbreaks.

I find that in a number of these outbreaks the fatality of the disease is variously reported as from two to about fifty per cent. Owing to these peculiarities it is difficult to determine to just what extent the disease ordinarily prevails. The outbreak in Fiji is said to have carried off between a fifth and a quarter of the population, and the epidemic in the Faroe Islands in 1846 affected six thousand persons out of a total population of 7,782. The morbidity statistics are unsatisfactory, owing to the fact that in places where notification is compul-

sory, a large proportion of the cases occurring among the poor are not seen by a physician and thus escape registration. This imperfection also renders the figures expressing the fatality misleading. The death-rate is open to less objection and may be used for the purpose of making a rough comparison. In Cambridge the mean annual death-rate for the seventeen years 1879-95 inclusive, was 9 per 100,000 persons living. During this period there were two years, 1879 and 1894, when no deaths from measles were recorded; that is, the word "measles" did not occur in the death certificate. When it did occur, no matter whether it had pneumonia or bronchitis or anything else along with it, I have taken that as a measles death. The year 1887 was an exceptional one, when there were nearly fifty deaths reported as due to measles. The following table gives the years and the death-rate per 100,000 living in each year:—

1879	0	1888	3
1880	7	1889	17
1881	3	1890	1
1882	1	1891	11
1883	15	1892	2
1884	1	1893	14
1885	16	1894	0
1886	6	1895	3
1887	68		

The following table will show that there is considerable variation in different places in the death rates:—

DEATH RATE PER 100,000 LIVING 1884-93.

London	61	St. Petersburg	73
Paris	52	Berlin	22
Brussels	35	Vienna	54
Amsterdam	50	Rome	62
Copenhagen	49	New York	42
Stockholm	54		

The opinions of London Health Officers regarding this subject are very valuable, as these officers deal with large numbers of cases. The population of the Administrative County of London in the middle of 1894 was estimated at 4,370,135. The following are the opinions of some of these officers:—

KENSINGTON (estimated population 167,350).—"Many lives might

be saved were it practicable to isolate, in hospital, children suffering from measles, especially such as live in over-crowded houses tainted with foul air, and under conditions which preclude the care so necessary in the nursing and management of measles."

FULHAM (estimated population 110,993).—"The results of notification in other communities do not seem, in the absence of isolation hospitals, to be commensurate with the heavy outlay incurred. But he refers to a modified system of notification by which the first attack in every house only is notified, and states his opinion that this, at any rate, would have the effect of impressing parents with the sense of the serious nature of the disease, and would give better control over the attendance at school of children from infected houses."

WESTMINSTER (estimated population 54,414).—"On the 1st of April, 1894, the vestry voted to abandon notification."

HAMPSTEAD (estimated population 75,443).—"Measles was epidemic, being chiefly spread by the agency of schools."

WANDSWORTH (estimated population 179,518).—"Efforts were made to prevent the attendance at school of children from invaded families, in all cases which became known to the medical officer of health, who expresses the opinion that the great advantage of notification of the disease would be the ability to adopt this course universally."

Dr. Sykes, Medical Officer of Health for St. Pancras (estimated population 233,739) enumerates some of the reasons for and against notification as follows: "Measles causes a larger number of deaths than any other zymotic disease, excepting whooping-cough and diarrhoea; it is highly infectious, and the infectiousness continues after the appearance of the rash and until the branny desquamation ceases. It is largely spread through the medium of schools; it is too late to close schools after the disease has obtained a hold. The protection of schools would be furthered by notification enabling infected children to be detained at home. The provision of isolation in hospital, which should follow upon notification, would, besides checking the spread of the disease, give the sufferers a better chance of recovery under improved conditions. On the other side, notification would be of little value unless provision were made of isolation in hospital. The disease mainly prevails among children before school age. It is infectious before the rash appears, and therefore before diagnosis is

confirmed, if medical opinion be sought; but, in the majority of cases, or probably in at least one-half, medical advice is not sought."

Dr. Littlejohn, in his account of ten years' compulsory notification in Edinburgh, says, "In a large town with a susceptible population, and hospital accommodation necessarily limited, notification as a means of checking the disease is practically useless."

We see that all through these reports and opinions much stress is laid on the isolation of cases in hospital. Those of us who are health officers or members of Boards of Health can tell what prospect there is, in their respective cities and towns, of isolation hospitals of a size such as would enable them to deal efficiently with epidemics of measles.

Closing schools to check the spread of measles is stated to have been effective in outbreaks occurring in Jarrow, a village and borough in the County of Durham, England. The borough has a population of about 34,000.

The efficacy of school-closing depends largely upon the opportunities existing for communication among the pupils out of school.

In the last Annual Report of the Medical Officer of the Local Government Board there is a very full consideration of the subject we have for discussion to-day. Dr. Thorne, in summing up the Report upon Measles by Dr. Theodore Thomson, says among other things: "With regard to checking the extension of measles in an invaded district. If preventive measures as regards schools are to be of avail, they must be contrived to secure the systematic exclusion from school of all children from any house which is invaded by measles, and they may even, on occasion, have to be extended to exclusion of children living in the neighborhood of invaded houses. For the same reason, if, on account of any exceptional prevalence of measles, general closure of public elementary schools has to be resorted to, a similar measure requires to be applicable to all schools in the invaded neighborhood, to Sunday and private schools as well as to public elementary schools, and to other gatherings of children, before real advantage can be expected from the proceeding."

I think very few Boards of Health in this State would be willing or able to put in force such a system as that outlined above by Dr. Thorne.

In Cambridge we have introduced notification, and, when it is

known that a child is ill of measles, that child is excluded from school,—but no other children living in that household, only the child that is ill.

VICE-PRESIDENT DURGIN.—Dr. Farnham's paper is now open for discussion. Dr. Chapin, shall we hear from you?

DR. CHAPIN.—Mr. President, last spring in Providence we revised our rules concerning the management of contagious diseases, and the whole matter was very freely discussed for two evenings at the meeting of the local Medical Society. The society, contrary to my advice, unanimously advised a rule that should require physicians to report cases of measles, and that all children living in a family where there was a case of measles should be excluded from the public schools. The law was adopted in that form, and the result was just exactly what I expected it would be. From the time of the adoption of the law, I imagine perhaps one-quarter of the cases of measles which occurred in Providence were reported. The others were not. I have no doubt that physicians themselves attended quite a number of cases which they forgot to report, and I know that in a majority of the cases no physician was called at all.

We attempted, in carrying out the law, to exclude the children who lived in the family where the case of measles was. Of course I do not know of but a small proportion, perhaps a quarter or third of the cases of measles. Now, it seems to me it worked a very great hardship to exclude the children in a few of the families, and not exclude them in all. But we could not exclude them in all, for we did not know of all the cases. That appears to me to represent the whole difficulty in the management of measles. We cannot possibly know of all the cases, because they do not have a physician. Furthermore, even if they do call a physician, the chances are that the physician is not called on the first or second or third day, or until the eruption appears. Now, we know that measles is contagious before the eruption appears, for three or four days, so that a large proportion of the cases are not recognized, even when a medical attendant is called, until they have been sick for several days, and have quite likely been mingling with other children and spreading the disease.

I had quite a long talk with Dr. Benedict, who has charge of the division of contagious diseases in New York where they have had a similar law for a large number of years. It is his opinion that the law is no good at all and that it does not prevent the spread of measles, that they have just as much measles in New York City as if they had no law at all. That is the opinion of health officers in other places where the law is in force. A paper was read at the meeting of the Public Health Association in Buffalo. I only heard part of it, but I think Dr. Farnham heard the whole of it. It was by Dr. Bracken of Minneapolis, where they had a similar law, and where I believe they had a placarding law. And it was his opinion that the measures taken do not accomplish the desired results. I fail to see how, under the circumstances,—the difficulty of the early diagnosis, the fact that physicians are not called,—I fail to see how we can exclude a sufficient number of children from school to accomplish anything. I believe that the only thing for us to do is to do a very illogical thing indeed; and that is, simply to exclude every child from school that we know has the measles. That surely is illogical, but at the same time I do not see how we can do anything else. Public opinion would not permit of a child that has measles going to school, and so we ought to keep them out when we know of it. But if we attempt to make a general law, such as we made at Providence and such as is in force in New York, as far as it could be in force, I do not think it accomplishes anything, but only creates friction; and the less friction we can create in cases of contagious disease, the better. It is bad enough to use isolating and restricting measures in diphtheria and scarlet fever, where we know we can do some good,—it is bad enough to irritate both parent and teacher in those cases; but, if we attempt to do it with measles, we are only producing a great deal of friction, without producing the desired results. I believe these views are the views which are generally held in this country by health officers who have had any experience in the management of these cases. They may differ from this in England; local conditions may differ here from what they are in England. At any rate, I have fully as much confidence in the practical judgment of American health officers and the members of this Association as I have in the opinion of medical health officers in England.

DR. FIELD.—In 1887 we had an epidemic of measles in Lowell. I believe there were 108 deaths. Since that time we have made it a regulation that measles should be reported to the Board of Health, and I really believe it has done some good. I am surprised it has done good, because Lowell physicians do not all help the Board of Health. But certainly more than a quarter of the cases—I think fully half of our cases—are reported; and, in addition, the teachers in the primary schools, if they notice that a child is ill with the known symptoms of measles, very often will state their suspicions to the Board of Health.

Again, if one child is excluded from school, his mother will say, “I don’t see why my boy has to stay at home when So-and-so’s boy goes to school”; and we go to that house, when there is no doctor, and find a case of measles. So we really get track of more than half the cases of measles. And we keep from the school, not only the child who has measles, but every other child in the family. It certainly accomplishes some good; not all the good that we wish it did, but we would not do away with the notification of measles.

DR. S. W. ABBOTT.—I have here some maps that were made a few years ago, which show the prevalence of measles in the State during the period of twenty years, from 1871 to 1890. There are some peculiarities in these maps that are worth looking at. You will see the towns are colored in different ways: dark red for the highest mortality, a lighter shading for the next, and then a different and still lighter shading and then a lighter still,—making five different grades. And then, in these towns that have no shading, there were no deaths whatever in the twenty years. There were some ninety-five towns in the whole period of twenty years that had no deaths whatever from measles; but they were almost all of them small towns; I do not think any of them had over five thousand inhabitants, probably not over three or four thousand. There are certain groups of these towns worth noticing. Here is one, consisting of Wendell, Shutesbury, Enfield, Greenwich, Dana, Hardwick, New Braintree, Oakham; most of those towns were isolated and not on the line of any railroad location. The same thing is true of various diseases; the railroads seem to be a certain communication for the spread of diseases from one town to another. There are several other towns,

Plainfield, Conway, Goshen, Chesterfield, Worthington, Huntington, Whately (a little district entirely isolated from all communication), in which there were no deaths from measles.

Just a word about the fatality of it. During the five years, 1891, 1892, 1893, 1894, and 1895, out of 20,000 reported cases in the State there were 325 deaths in the cities and large towns from measles,—making a percentage of fatality of only 1.6. But I have no doubt, as Dr. Farnham and others have stated, that a very large number do not get reported, of those perhaps where the parties are not treated by physicians. So there may have been 50,000, reducing the fatality during that time to less than one per cent.

By the way, there is a little diagram here, which I will also pass round, which gives, it seems to me, a very good idea of the seasonal prevalence. You will notice in this diagram a shading down immediately after the month of June, as though the closing of the schools stopped the disease. And that is made up from the deaths during nine years and from probably about three or four thousand deaths in all. Scarlet fever has the same peculiarity; but scarlet fever rises in the fall with the opening of the schools, while the low mortality from measles continues on throughout the last half of the year, as though the persistence of scarlet fever, or the power of the germ to recover its vitality, was greater than that of measles. I do not know how it could be explained in any other way.

DR. BOWERS.—I must express some disagreement with some of the sentiments uttered. I had hoped that the feeling of the Boards of Health would be one of progression rather than otherwise. Just because the results of the treatment of these cases of epidemic diseases have not been wholly satisfactory, it does not seem to me that we should be any less careful, or that Boards of Health should give up adopting such precaution as may tend to reduce the danger as much as possible.

In the town of Clinton a year ago we had an epidemic of measles, and 185 cases were reported. There were 4 deaths. During the same year we had 19 cases of scarlet fever reported, and there were no deaths. If a disease produces a certain number of deaths, if it is contagious, it seems to me clearly the right and duty of the Board of Health to protect the community just so far as it is able to do it.

And I believe that the matter of placarding houses, of requiring notification, and all that sort of thing, tends to impress on the public mind the fact that that disease is a dangerous one to the public health. And I think Boards of Health ought to adopt the position of making those things more positive, more definite, and of trying harder to control them, even though the difficulties may be so great that the control may not be so effective as may be desirable. And I do not want the discussion to go by without placing myself clearly on that side.

DR. DURGIN.—It is the custom in the city of Boston to have cases of measles reported by physicians, and each day we send a bulletin of those cases to all the schools, so that, under the regulation of the School Committee, the children from such families are kept out of school. I believe that this one measure does a great deal of good, and I am under the impression that we get a very large percentage of the cases reported. It has rather grown upon the people of our city; and the habit is fairly established for the physicians to report the cases and for the parents to recognize the need of it. We do not insist, to a great extent, upon the means of isolation, disinfection, placarding, etc., as we do in other diseases, such as diphtheria and scarlet fever. But we think there is a duty upon us of taking some measure which may appear reasonable in preventing the large spread of this one disease, the mortality from which at times has been very large in our city. Certainly none of us would feel that the health authorities were doing right in permitting children to come into the school with measles and sit next our own children, any more than we would like them endangered from any other source.

The legislature did not include measles in its Act which prohibits the attendance at school of any child from a family in which there are cases of diphtheria and scarlet fever. But the School Committee took the matter up, and, under the advice of the Board of Health, included in its regulation measles.

There must be others who would like to add a word to this interesting discussion.

MR. NEWCOMB.—To myself, as executive officer in one of your suburban cities, it seems very trying to sit and listen to the confes-

sions which have been made here this afternoon as to the weakness of our position. Salem is passing through an experience at present, which, I feel certain, if you gentlemen knew the facts, would enable you to appreciate the feelings of the Board of Health of Salem.

If we confine ourselves to the subject of measles,—or possibly we might digress a little and say zymotic diseases, closing school, and just two or three points incidental to the subject,—it seems to me that you have omitted one possible way of doing some good; namely, having some competent medical adviser make visits to the schools and examine, if no better opportunity presents itself, such cases as come to the attention of the teacher or teachers where children are complaining of aches or pains out of the common. The method is crude, I allow, but it is much better than none at all.

Again, if we discuss the question of closing schools, we meet opposition in that; we are meeting opposition at present in our city on the part of the School Board because we have closed schools there already,—and quite extensively, too. Not only the public schools, but we have closed two parochial schools and several other private schools. We have quite an epidemic of diphtheria, and on that account this closing of schools has been occasioned. But it seems to me much good might be started by having visits made to the schools by some competent adviser; and, in the absence of better methods, it might be well to practise that.

I have sat here this afternoon, carefully listening to your remarks, and the gentleman from Clinton did arouse me, because it seems to me as if there were abundant exposures of the weakness of our laws; and it seems to me, instead of having so much of these exposures, we ought to have the laws made so we will be able to know where we stand, and give the Board of Health a chance to enforce the laws a little more freely and a little more comfortably.

VICE-PRESIDENT DURGIN.—What measures should be taken to restrict the spread of measles? It is still an interesting question, and shall we hear from others? Is there nothing more to be said on this subject?

DR. ABBOTT, of Andover.—I should like to ask Dr. Abbott in regard to the return of the packages we have to send out for the treatment of diphtheria, if those could be replaced?

SECRETARY ABBOTT.—Certainly. Do you mean the anti-toxin bottles?

DR. ABBOTT.—Yes, sir.

SECRETARY ABBOTT.—Certainly. We shall be very glad to replace them. Did you return some to us?

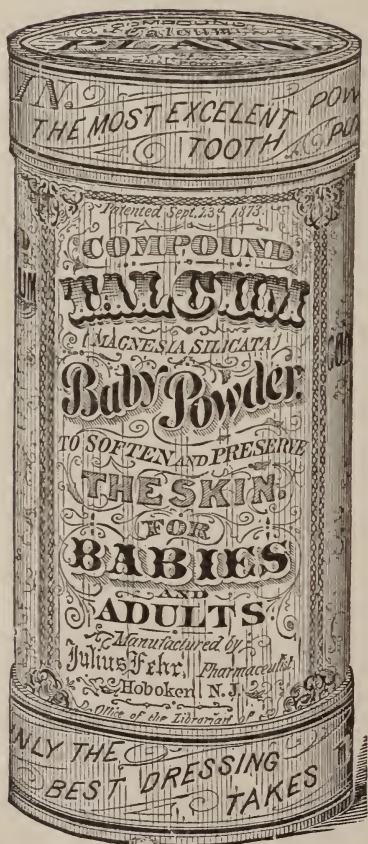
DR. ABBOTT.—Yes, sir.

SECRETARY ABBOTT.—It must have been an oversight. Anti-toxin will keep for a long time. It has been stated, as a result of experiment, that it will keep four or five months under good circumstances. And it comes across the sea,—sometimes, probably, six months old. We will replace it, however, under any reasonable length of time.

VICE-PRESIDENT DURGIN.—The Chair would take occasion to say that the Committee on Papers and Discussions will always feel grateful for any suggestions. If members of the Association have questions that they would like to hear discussed at the meetings, we shall always be glad to hear from them, so that all parts of the State and all members of the Association may have such questions discussed as will interest them most.

If there is nothing further, the meeting will stand adjourned.

DR. JULIUS FEHR'S
"COMPOUND TALCUM"
"BABY POWDER."



THE
"Hygienic Dermal Powder"
 FOR
INFANTS AND ADULTS.

Originally investigated and its therapeutic properties discovered in the year 1868 by Dr. Fehr, and

Introduced to the Medical and Pharmaceutical profession by Dr. Fehr, in the year 1873.

COMPOSITION.

Silicate of Magnesia with Carbolic and Salicylic Acids.

PROPERTIES.

Antiseptic, Antizymotic, and Disinfectant.

USEFUL AS A GENERAL SPRINKLING POWDER,
 With positive Hygienic, Prophylactic, and Therapeutic Properties.

GOOD IN ALL AFFECTIONS OF THE SKIN.

Sold by the Drug Trade Generally.

Per Box, Plain	. . .	\$0.25
Per Dozen	. . .	1.75
Per Box, Perfumed50
Per Dozen	" . . .	3.50

THE MANUFACTURER,

JULIUS FEHR, M.D.,

Ancient Pharmacist,

Hoboken, N.J.

Only advertised in Medical and Pharmaceutical prints.

MEMBERS MASSACHUSETTS ASSOCIATION OF BOARDS
OF HEALTH.

AMESBURY.

J. A. Fitz-Hugh, M.D.

ANDOVER.

Charles E. Abbott, M.D.

BELMONT.

H. A. Yenetchi, M.D.

BOSTON.

George F. Babbitt.
Alexander Burr, D.V.S.
J. W. Cosden, M.D.
R. F. Davenport, M.D.
Charles E. Davis, Jr.
F. W. Draper, M.D.
S. H. Durgin, M.D.
W. L. Hicks.
Thomas Jordan.
W. G. Macdonald, M.D.
Laurens Maynard.
J. H. McCollom, M.D.
W. H. Mitchell.
Austin Peters, D.V.S.
E. L. Pillsbury.
Edw. N. Quinn.
Prof. W. T. Sedgwick.
Thomas B. Shea, M.D.
Herbert Small.

BROCKTON.

Charles H. Cary.
H. M. Locke, M.D.
F. J. Ripley, M.D.
L. F. Severance.
F. Herbert Snow, C.E.

BROOKLINE.

H. L. Chase, M.D.
James M. Codman, Jr.
F. H. Osgood, M.R.C.V.S.

CAMBRIDGE.

E. R. Cogswell, M.D.
Edwin Farnham, M.D.
Charles Harris.
Edmund M. Parker.
E. E. Spencer, M.D.
H. P. Walcott, M.D.

CLINTON.

W. P. Bowers, M.D.
C. L. French, M.D.
George J. Ott.

COHASSET.

Oliver H. Howe, M.D.

DEDHAM.

E. W. Finn, M.D.

DUXBURY.

N. K. Noyes, M.D.

EVERETT.

G. W. Davies.
E. Cazneau Newton, M.D.
J. S. Norton, M.D.
W. B. Smith.

FALL RIVER.

M. A. Cummings, M.D.
L. P. DeGrandpre, M.D.
Charles A. Hicks, M.D.

FITCHBURG.

J. L. Bresnahan.
John D. Kielty, M.D.
Charles H. Rice, M.D.
Clarence W. Spring, M.D.

GARDNER.

E. A. Sawyer, M.D.

GLOUCESTER.

W. H. Dennen.
Charles H. Morrow, M.D.

HAVERHILL.

John F. Croston, M.D.

LANCASTER.

George L. Tobey, M.D.

LEOMINSTER.

C. E. Bigelow, M.D.
H. N. Spring.
A. L. Whitney.

LOWELL.

James Bayles.
Charles R. Costello.
James B. Field, M.D.
J. Arthur Gage, M.D.
W. P. Lawler, M.D.
O. P. Porter, M.D.

MARLBORO.

William S. Richardson, M.D.

MEDFORD.

J. E. Clark, M.D.

MELROSE.

J. E. Sanborn, M.D.
Joseph W. Spalding.
E. L. Warren, M.D.

MIDDLEBORO'.

J. A. Burgess.
A. T. Savery.
A. Vincent Smith, M.D.

MILLBURY.

H. W. Cronin, M.D.

MILTON.

H. P. Jaques, M.D.
W. H. Kennedy.
Thomas N. Perkins.
C. Minot Weld.

NEEDHAM.

A. E. Miller, M.D.
A. M. Miller, M.D.

NEW BEDFORD.

Nathaniel Hathaway.
William G. Kirschbaum.
Louis H. Richardson.
W. N. Swift, M.D.

NEWTON.

J. C. Brimblecom.

NEW YORK CITY.

Col. W. F. Morse.

NORTH BROOKFIELD.

T. J. Garrigan, M.D.

PROVIDENCE, R.I.

C. V. Chapin, M.D.
Gardner T. Swarts, M.D.

QUINCY.

B. F. Thomas.

SALEM.

Richard D. Connelly.

W. H. Fullam.

W. H. Gove.

Raymond L. Newcomb.

Jesse Robbins, M.D.

George A. D. Stickney.

David P. Waters.

SOUTH BETHLEHEM, PA.

Prof. T. M. Drown.

SPRINGFIELD.

W. H. Chapin, M.D.

James Kimball.

TAUNTON.

W. Y. Fox, M.D.
Charles H. Macomber.
James E. Seaver.
Frank C. Walker, M.D.
Eli Wordell.

WAKEFIELD.

S. W. Abbott, M.D.

WALTHAM.

E. H. Brower.
E. R. Cutler, M.D.
E. Irving Smith.

WARE.

W. W. Miner, M.D.

WARREN.

J. W. Hastings, M.D.

WAVERLEY.

L. B. Clark, M.D.

WESTON.

R. H. Dickson, Jr.
F. W. Jackson, M.D.

WHITMAN.

C. E. Lovell, M.D.

WINTHROP.

A. B. Dorman, M.D.

WOBURN.

James H. Conway, M.D.
B. Frank Waldron.

WORCESTER.

F. H. Baker, M.D.
George E. Batchelder.
W. T. Clark, M.D.
James C. Coffey.
Prof. L. P. Kinnicutt.
J. F. McCartney.
L. F. Woodward, M.D.

MEMBERS MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

OFFICERS FOR 1896.

President.

HENRY P. WALCOTT, M.D.

Vice-Presidents.

S. H. DURGIN, M.D. S. W. ABBOTT, M.D.

Secretary.

EDWIN FARNHAM, M.D.

Treasurer.

JAMES B. FIELD, M.D.

Executive Committee.

W. H. CHAPIN, M.D.

J. A. GAGE, M.D.

NATHANIEL HATHAWAY.

E. A. SAWYER, M.D.

W. P. BOWERS, M.D.

W. T. FOX, M.D.

J. C. COFFEY.

G. L. TOBEY, M.D.

W. H. GOVE.

J. E. CLARK, M.D.

ANDOVER.

Charles E. Abbott, M.D.

BELMONT.

H. A. Yenetchi, M.D.

BOSTON.

George F. Babbitt.

Alexander Burr, D.V.S.

J. W. Cosden, M.D.

R. F. Davenport, M.D.

Charles E. Davis, Jr.

F. W. Draper, M.D.

S. H. Durgin, M.D.

Harold C. Ernst, M.D.

W. L. Hicks.

Thomas Jordan.

J. H. McCollom, M.D.

W. G. Macdonald, M.D.

Laurens Maynard.

W. H. Mitchell.

Austin Peters, D.V.S.

E. L. Pillsbury.

William H. Prescott, M.D.

Prof. W. T. Sedgwick.

Thomas B. Shea, M.D.

Herbert Small.

Theobald Smith, M.D.

BROCKTON.

Charles H. Cary.

F. J. Ripley, M.D.

L. F. Severance.

F. Herbert Snow, C.E.

BROOKLINE.

H. L. Chase, M.D.

James M. Codman, Jr.

F. H. Osgood, M.R.C.V.S.

CAMBRIDGE.

Lewis L. Bryant, M.D.

E. R. Cogswell, M.D.

Edwin Farnham, M.D.

Charles Harris.

Edmund M. Parker.

E. E. Spencer, M.D.

H. P. Walcott, M.D.

CLINTON.

W. P. Bowers, M.D.

C. L. French, M.D.

George J. Ott.

COHASSET.

Joseph S. Bigelow.

Oliver H. Howe, M.D.

DEDHAM.

E. W. Finn, M.D.

DUXBURY.

N. K. Noyes, M.D.

EVERETT.

G. W. Davies.

S. A. Freeman, M.D.

E. Cazneau Newton, M.D.

J. S. Norton, M.D.

W. B. Smith.

FALL RIVER.

M. A. Cummings, M.D.

L. P. DeGrandpre, M.D.

Charles A. Hicks, M.D.

Archibald St. George, M.D.

FITCHBURG.

J. L. Bresnahan.

John D. Kielty, M.D.

Charles H. Rice, M.D.

Clarence W. Spring, M.D.

GARDNER.

E. A. Sawyer, M.D.

HAVERHILL.

John F. Croston, M.D.

HYDE PARK.

Willard S. Everett, M.D.
Edwin C. Farwell.
A. D. Holmes, M.D.
J. C. Lincoln, M.D.

LANCASTER.

George L. Tobey, M.D.

LEOMINSTER.

C. E. Bigelow, M.D.
H. N. Spring.
A. L. Whitney.

LOWELL.

James Bayles.
Charles R. Costello.
James B. Field, M.D.
J. Arthur Gage, M.D.
Thomas F. Harrington, M.D.
W. P. Lawler, M.D.
O. P. Porter, M.D.

MARLBORO.

William S. Richardson, M.D.

MEDFORD.

J. E. Clark, M.D.

MELROSE.

J. E. Sanborn, M.D.
Joseph W. Spalding.
E. L. Warren, M.D.

MIDDLEBORO.

J. A. Burgess.
A. T. Savery.
A. Vincent Smith, M.D.

MILLBURY.

H. W. Cronin, M.D.

MILTON.

H. P. Jaques, M.D.
Thomas N. Perkins.
C. Minot Weld.

NEEDHAM.

A. E. Miller, M.D.
A. M. Miller, M.D.

NEW BEDFORD.

Nathaniel Hathaway.
William G. Kirschbaum.
Louis H. Richardson.
W. N. Swift, M.D.

NEWTON.

J. C. Brimblecom.

NEW YORK CITY.

Col. W. F. Morse.

NORTH BROOKFIELD.

T. J. Garrigan, M.D.

PROVIDENCE, R.I.

C. V. Chapin, M.D.
Gardner T. Swarts, M.D.

QUINCY.

B. F. Thomas.

SALEM.

Richard D. Connelly.
W. H. Fullam.
W. H. Gove.
Raymond L. Newcomb.
Jesse Robbins, M.D.
George A. D. Stickney.
David P. Waters.

SOUTH BETHLEHEM, PA.

Prof. T. M. Drown.

SPRINGFIELD.

W. H. Chapin, M.D.
James Kimball.

TAUNTON.

W. Y. Fox, M.D.
Charles H. Macomber.
James E. Seaver.
Frank C. Walker, M.D.
Eli Wordell.

WAKEFIELD.

S. W. Abbott, M.D.

WALTHAM.

E. R. Cutler, M.D.
E. Irving Smith.

WATERTOWN.

Julian A. Mead, M.D.

WAVERLEY.

L. B. Clark, M.D.

WESTON.

R. H. Dickson, Jr.
F. W. Jackson, M.D.

WHITMAN.

C. E. Lovell, M.D.

WINTHROP.

A. B. Dorman, M.D.

WOBURN.

James H. Conway, M.D.
B. Frank Waldron.

WORCESTER.

F. H. Baker, M.D.
George E. Batchelder.
W. T. Clark, M.D.
James C. Coffey.
Prof. L. P. Kinnicutt.
J. F. McCartney.
L. F. Woodward, M.D.

DISEASE IN CARPETINGS.

A METHOD WHICH DISINFECTS, CLEANSSES, AND DOES NOT HARM.

After a practical experience of ten years, long investigation, and careful experimenting, I am able to present to physicians and the public a method for disinfecting and renovating carpets which are infected by the germs of disease which I believe to be the simplest, the least expensive, and, above all, the most efficacious of any now in use. Moreover, this method is absolutely uninjurious to the fibre or the coloring of the carpet, it can be applied perfectly well on the floor, and it is so rapid in its effect that the carpets of an entire house can be renovated in a day.

In the first place, every noxious germ is immediately destroyed. In the second place, the carpet when cleaned is entirely freed from stains of all kinds. Many carpets, it may be added in this connection, come from the factory with the oils used in dyeing improperly laid in; and, as oil has a great affinity for carbon, they are soon streaked and stained by the soot from the lamp, the gas jet, or the grate. My process, which is especially adapted to the removal of greasy and oily stains, easily neutralizes this original excess of oil, and in these cases actually leaves the carpet more evenly and freshly colored, and with a greater chance of permanency in the color, than when it was bought.

Not only are the color and weave of the finest English, Scotch, and American carpets wholly unharmed by the application of my process, but I have also made a careful study of the dyes used in the rarest and softest ORIENTAL carpetings and rugs,—Herats, Persian, Bokharas, Anatolian, Daghestans, and the rest,—so that I can cleanse and disinfect them *without injury to their peculiar beautiful finish and coloring*.

But my method not only disinfects and cleanses: it DESTROYS THE LARVÆ AND EGGS OF MOTHS AND BUFFALO BUGS. More, it renders a carpet or a rug absolutely IMPERVIOUS TO FUTURE ATTACKS from these pests, and for a very simple reason: it makes the wool unpalatable to them.

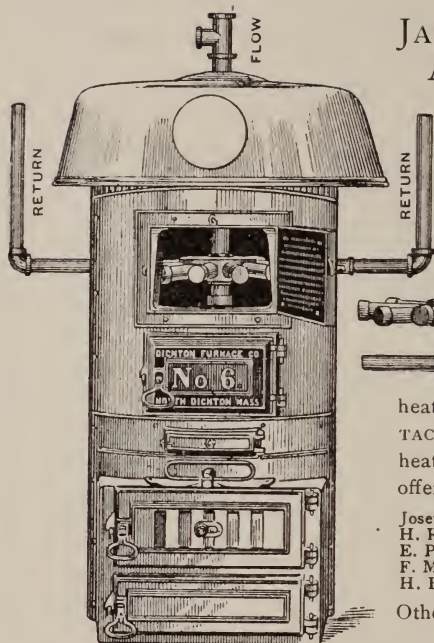
In a word, my methods are SURE, SAFE, RAPID, and CHEAP.

In houses furnished with expensive carpets or rugs, the owners of which are solicitous that they be not injured through careless processes of disinfection, my process will, I believe, be found as satisfactory to the owner as to the physician who has ordered the disinfection.

Estimates of work to be done in any part of the State furnished at once, and, if found satisfactory, skilled workmen sent immediately. For a number of years the chief carpet stores of Boston, New York, and Philadelphia have relied on me for this sort of work; and, if more convenient, orders may be left with them for me.

F. G. SAYLOR,

Workrooms, 31 Hayward Place, Boston.



JAMAICA HOT WATER ATTACHMENT FOR FURNACES.

OFFICE OF J. F. HOUGHTON & SON,
99 Green St., Jamaica Plain.

"The great problems in mechanics are not so much to discover new forces as to reduce the wastage in present ones." Your present hot air furnace will generate sufficient

heat; our JAMAICA HOT WATER ATTACHMENT added will distribute the heat where needed. In proof of this we offer these references:—

Joseph Stedman, M.D.	A. W. Blair, M.D.
H. R. Stedman, M.D.	G. T. Cushman, M.D.
E. P. Gerry, M.D.	F. C. Jillson, M.D.
F. M. Weld, M.D.	S. T. Davis, M.D.
H. B. Cross, M.D.	

Other references and full information given as required.

JOHN REARDON,
(Late of Dudley & Reardon.)

COPPERSMITH,

Manufacturer of COPPER BATH BOILERS, WASH BOILERS, GUTTERS and CONDUCTORS OF COPPER, ZINC, or GALVANIZED IRON. Repairing of Gutters, Conductors, etc. Wash Boilers and Saucepans Tinned.

111 Albany Street, BOSTON.
(Between Harvard and Oak Street.)

Orders by mail
promptly attended to.

M. & H. H. COLLINS,

TELEPHONE 102 ROXBURY.

Practical Plumbers.

Personal attention given to Trapping and Ventilating House Drains.

121 Dudley Street, Boston Highlands.

JOBGING PROMPTLY ATTENDED TO.

